FAUNA LITTORALIS NORVEGIAE ★ SARS PT.2

FAUNA

LITTORALIS NORVEGIÆ

UDGIVET

AF

J. KOREN og Dr. D. C. DANIELSSEN,
(OVERLÆGE.)

3DIE HEFTE.

MED 16 TAVLER.

BERGEN.
(TRYKT HOS J. D. BEYER.)
1877.

FAUNA

LITTORALIS NORVEGIÆ

EDITED

BY

J. KOREN AND Dr. D. C. DANIELSSEN,
CHIEF-PHYSICIAN.

PART 3.

WITH 16 PLATES.

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FORORD.

Siden 2det Hefte af Fauna littoralis Norvegiæ udkom, er der hengaaet en meget lang Tid, og i dette lange Tidsrum har Døden bortrevet vor Ven og Medarbeider Professor, Dr. Michael Sars. Ligesom hans Bortgang var et stort Tab for den zoologiske Videnskab, saaledes vil ogsaa Savnet, han efterlod sig i sit Fædreland, længe blive følt. Hans grundige og omfattende Forskninger forskaffede ham en Berømthed, der gjennem alle Tider vil kaste Glands over det Land, han tilhørte.

Hans Minde være 3die Hefte af Fauna littoralis Norvegiæ tilegnet.

Mange Omstændigheder have bidraget til at dette Hefte, til hvis Udgivelse Storthinget med dets sædvanlige Liberalitet har ydet et Pengebidrag af 4000 Kroner, først nu udkommer.

I videnskabelig Henseende leve vi her temmelig isoleret, blottet for en god Del af de Hjelpemidler, der i høi Grad lette Udgivelsen af et saadant Arbeide, som det foreliggende. Det eneste Bibliothek, foruden vor private Bogsamling, som findes her paa Stedet, er Museets, og dette er saa mangelfuldt, baade hvad den ældre og nyere Literatur angaar, at vi langveis fra have maattet forskaffe os de nødvendigste literære Hjelpemidler. Men hvad der dog mest har bidraget til at forsinke Udgivelsen, er den Omstændighed, at her kun er een Kunstner, til hvem vi kunde overdrage Udførelsen af Lithographierne, — og denne Mand har i Aarvis opholdt os, hvorfor vi ogsaa have været nødtvungne til i Uddrag at publicere en Del af de Afhandlinger, som findes i dette Hefte. Alt dette vil forhaabentlig tjene os til Undskyldning for de Mangler, der maatte klæbe ved Arbeidet.

Vi skylde at tilkjendegive Hr. Overlæge G. Armauer Hansen vor forbindtligste Tak for den Assistance, han har ydet os ved de histologiske Undersøgelser.

BERGEN, 25de April 1877.

UDGIVERNE.

PREFACE.

We have been obliged to allow a very long time to pass, since the second part of Fauna littoralis Norvegiæ appeared. In the interval between that time and now, death has deprived us of our highly esteemed friend and collaborator, Professor, Dr. Michael Sars. As his decease was a great loss to zoological science, all those who knew and loved him in our Fatherland, will miss him extremely much and long. The excellence and profundity of his thoroughgoing inquiries, gave him a celebrity which, throughout all times, will throw a lustre on the country to which he belonged.

We therefore consecrate the present third part of Fauna littoralis Norvegiæ to his memory.

With its usual liberality, our National Assembly (Storthing) has granted us 4000 Crowns to enable us to publish this part of the present work, but many circumstances have contributed to prevent us from making it appear before now.

In all scientific respects we live here rather isolated, devoid of the greatest part of all the aids, that would have made the publication easier of a work of this kind. Besides our private libraries, there is no library existing in our town, except the one in our Museum, which however is so deficient as to all literary matters both of elder and of a more modern date, that we have been obliged to procure from distant places all the literary aid required. But what even more has retarded the publication of the present work, is that we have but one artist in our town, whom we could trust with the lithographies necessary. And most unfortunately he has occasioned a delay of several years. We have therefore been obliged earlier to publish some extracts of the treatises now found here. We also hope that all these unfortunate circumstances will plead for us, if the deficiencies of this work should prove too apparent.

We give our best and sincerest thanks to the chief-physician, Mr. G. Armauer Hansen, for the valuable assistance he has given us through his histological researches.

BERGEN, 25. April 1877.

THE EDITORS.

INDHOLD.

CONTENTS.

Sipunculus norvegicus, n. sp. 123
— *priapuloides*, n. sp. 126
Phascolosoma Lovénii, n. sp. 128
— *squamatum*, n. sp. 130
— *abyssorum*, n. sp. 131
— *pallidum*, n. sp. 132
— *Eremita*, M. Sars 134
— *margaritaceum*, M. Sars 135
— *Harveii*, Forb. 136
— *papillosum*, Thomps. 138
— *vulgare*, Blainv. 139
— *Strombi*, Mont. 140
— — *varietas capitatum*, Rathke 140
— — — *verrucosum* 141
Onchnesoma, n. gen. 141
— *Steenstrupii*, n. sp. 142
— *Sarsii*, n, sp. 143
Tylosoma, n. gen. 145
— *Lütkenii*, n. sp. 145
Priapuloides, n. gen. 146
— *typicus*, n. sp. 147
Priapulus caudatus, Lamk. 150
Echiurus vulgaris, Savign 151
— *Lütkenii?* Dies 151
Bonellia viridis, Rolando 151

NYE OG MINDRE BEKJENDTE COELENTERATER

beskrevne af

M. SARS [1]).

I. OM DE NORSKE ARTER AF AMMESLÆGTEN CORYMORPHA.

Af denne mærkelige af mig allerede i 1835 opstillede Hydroideslægt har jeg foruden den først opdagede *C. nutans* S. til forskjellige Tider iagttaget ved vore Kyster endnu 3 andre Arter, hvoraf en kort Characteristik er given i Christ. Vid. Selsk. Forh. f. 1859. Hertil kommer endnu den af O. Schmidt ved Loppen i Finmarken iagttagne og i hans „Handatlas der vergleichenden Anatomie“ Jena 1854, Tab. 9, fig. 2 under Benævnelsen *Amalthœa uvifera* afbildede Hydroide, som utvivlsomt er en, og som det synes, ny Art af Slægten Corymorpha. Antallet af de norske Arter stiger saaledes herved til ikke mindre end 5. Man antog længe, at denne Slægt kun var indskrænket til de nordlige Have, indtil Steenstrup i Aaret 1854 (Vidensk. Meddelelser fra den naturhist. Forening i Kjøbenhavn, 1854 pag. 46) bekjendtgjorde en ny tropisk Art af denne Slægt fra Rio Janeiro under Navnet *Corymorpha Januarii* Stp. Foruden de anførte Arter kjender man endnu 2 herhen hørende Former, nemlig den ved de britiske Øer levende *Corymorpha nana* Alder (Catalogue of the Zoophytes of Northumberland and Durham, 1857 pag. 18) og den nord-

[1]) Anmærkning. De følgende Beskrivelser over norske Coelenterater have i mange Aar ligget færdige fra min Faders Haand til Indførelse i nærværende Hefte af Fauna litoralis Norvegiæ. Udgivelsen af Hæftet er imidlertid af forskjellige Aarsager og navnlig paa Grund af Lithographens Langsomhed bleven Aar efter andet udsat, saa at det først nu, mange Aar efter den Tid, da det oprindelig tænktes færdigt til Trykken, er bleven muligt at faa samme udgivet. Imidlertid har nu Videnskaben ogsaa i denne Branche gaaet fremad med Kjæmpeskridt, og det vil derfor være saare naturligt, om disse Beskrivelser ville synes Nutidens Zoologer noget antiqverede; de havde ganske sikkert fremkommet under en temmelig forskjellig Form, om Udarbeidelsen havde skeet senere. Jeg har dog ikke troet paa egen Haand at burde foretage nogen gjennemgribende Forandring ved min Faders Manuskript, men vil blot her bemærke, at man ved Bedømmelsen af denne Del maa erindre, at den oprindelig stammer fra en meget tidlig Periode og at der selvfølgelig ikke har kunnet tages noget Hensyn til de mange nyere Arbeider, som imidlertid ere fremkomne paa dette Felt.

G. O. Sars.

NEW AND LITTLE KNOWN CŒLENTERATES

DESCRIBED BY

M. SARS [1]).

I. OF THE NORWEGIAN SPECIES OF THE GENUS CORYMORPHA.

OF this remarkable Hydroid-genus established by me in 1835 I have at various times observed on our coasts, besides the first discovered *C. nutans, S.,* 3 other species of which a short characteristic is given in “Christ. Vid. Selsk. Forh.” for 1859. To these must be added the Hydroid noticed by O. Schmidt at Loppen in Finmark, and delineated in his “Handatlas der vergleichenden Anatomie,” Jena, 1854, Tab. 9, fig. 2. under the denomination *Amalthœa uvifera* which undoubtedly is a species, and apparently a new species, of the genus Corymorpha. The number of the Norwegian species is thus not less than 5. It was for a long time supposed that the genus was limited to the northern seas, until Steenstrup in the year 1854 (Vidensk. Meddelelser fra den naturhist. Forening i Kjøbenhavn, 1854, pag. 46) made known a new tropical species of this genus from Rio Janeiro under the name *Corymorpha Januarii,* Stp. Besides the species mentioned, 2 other forms belonging to the same genus are known, namely the *Corymorpha nana* Alder, living near the British Islands (Alder, Catalogue of the Zoophytes of Northumber-

[1]) Note. The following descriptions of Norwegian Cœlenterates were completed many years ago by my Father, with a view to their being inserted in this part of Fauna litoralis Norvegiæ. The publication was however delayed from year to year by various impediments, and especially by the tardy execution of the lithographic plates; so that it has not been possible to get it brought out until now, that is to say until many years after the time when, according to the original estimate, it ought to have been ready for the press. Meanwhile science has, in this branch also, been advancing with giant strides; and these descriptions may therefore very naturally appear somewhat antiquated to the zoologists of the present day; certainly they would have appeared in a rather different form if they had been more recently elaborated. I have not felt justified in making any essential alterations in my Father's manuscript, but will here only remark, that in appreciating this part of the work, we must remember that it originally dates from a very early period, and that consequently it has not been possible here to take any notice of the numerous more recent works which in the meantime have appeared in the same field.

G. O. Sars.

amerikanske *Corymorpha pendula* Agassiz (Contributions to the natural history of the United States, Vol. 4, pag. 276, Tab. 26, fig. 7—17). Det samlede Arteantal bliver saaledes 8, af hvilke 6 ere nordiske (de 3 af disse endog arktiske), 1 transatlantisk og 1 tropisk.

Arterne af denne Slægt have ialmindelighed i sin ydre Habitus og i Tentaklernes Form og Anordning stor Lighed med hinanden, og da desuden de sidstes Tal synes at være lidet bestemt og desuden at variere betydeligt efter Alderen, bliver det temmelig vanskeligt at adskille og diagnosere disse Former. Det bedste og sikkreste Kjendemærke afgive, efter min Erfaring, de af dem producerede Medusegemmer, der, som af det følgende vil sees, hos enhver af disse Arter vise en bestemt og characteristisk Form og Bygning.

1. *CORYMORPHA NUTANS,* M. Sars.

(Tab. 2, Fig. 25—28.)

Sars, Beskrivelser og Iagttagelser over Dyr ved den Bergenske Kyst, 1835, pag. 6, Tab. 1, Fig. 3, a-f.

Forbes & Goodsir, Annals of Nat.-Hist., 1840, Vol. 5, pag. 309.

Johnston, History of British Zoophytes, pag. 54, Tab. 7, Fig. 3—6.

Sars, Chr. Vid. Selsk. Forhandl., 1859, pag. 98.

I Aaret 1830 fandt jeg først denne Art ved Glesvær ved Bergen i 2 Expl. paa 30—40 F. D., paa dyndblandet Sand, senere nogle faa ved Manger paa 8—10 F. D., Sandbund, og endelig paa min første Reise til Finmarken i 1849 ved Reine i Lofoten 2 Expl. sammen med den følgende der i talrig Mængde forekommende Art paa 40—50 F. D., sandblandet Dynd.

Til min paa anførte Sted givne udførlige Beskrivelse af denne Art skal jeg her kun tilføie Følgende:

Exemplarer fra alle tre nævnte Localiteter stemme paa det nøiagtigste overens med hverandre.

Antallet af Tentakler synes, som ovenfor allerede bemærket, at variere og tiltage med Alderen. Hos de største Expl. taltes 40—50 af de nederste længere i en enkelt Rad eller Krands staaende Tentakler, hos mindre færre.

De gemmebærende Stilke (Fig. 26), 15—20 i Tallet, udmærke sig fra de følgende Arters ved deres forholdsvis større Længde, som udgjør en Trediedel af de nederste Tentaklers Længde, og ved deres spæde og grenede Form. De ere nemlig cylindriske eller traadformige, dog noget tykkere ved Basis og efterhaanden tyndere imod den ydre Ende, samt besatte paa hver Side med 3—4 langt fra hverandre staaende alternerende Grene (*b*) af samme Form, af hvilke de inderste eller nederste ere mindre, de øverste som undertiden ere tvedelte, større. — De talrige, idetheletaget meget smaa Medusegemmer (*c*), som ere forholdsvis meget mindre end hos de øvrige Arter, sidde tæt sammenhobede paa den ydre Ende af disse Grene, og ere af meget forskjellig Størrelse, fra en neppe med blotte Øine synlig Knop af og indtil $\frac{1}{2}$—$\frac{2}{3}$ M.m. Længde, alt efter deres mindre eller større Grad af Udvikling. De

land and Durham, 1857, p. 18), and the North American *Corymorpha pendula* Agassiz (Contributions to the natural history of the United States, Vol. 4, page 276, tab. 26, fig. 7—17). The total number of species is therefore 8, of which 6 northern (3 even arctic) 1 transatlantic and 1 tropical.

The species of this genus are usually in their external appearance and in the form and arrangement of the tentacles, very similar to each other; and as moreover the number of the tentacles seems to be inconstant and to vary considerably according to age, it is rather difficult to distinguish and to diagnosticate these forms. The best and most certain criteria are furnished, according to my experience by the gonozooids, which, as will be seen from the following descriptions, present in each of these species a definite and characteristic shape and structure.

1. *CORYMORPHA NUTANS,* M. Sars.

(Tab. 2, fig. 25—28).

M. Sars. „Beskrivelser og Iagttagelser over Dyr ved den Bergenske Kyst“, 1835, p. 6, Tab. 1, fig. 3 a—f.

Forbes & Goodsir, Annals of Nat.-Hist. 1840, Vol. 5, p. 309.

Johnston, History of British Zoophytes, p. 54, Tab. 7, fig. 3—6.

M. Sars, Chr. Vid. Selsk. Forhandl., 1859, pag. 98.

I found this species first in the year 1830 at Glesvær near Bergen, namely 2 specimens, at the depth of 30—40 fathoms, on miry sand; afterwards I found a few specimens at Manger in 8—10 fathoms on sandy bottom; and finally, when I first visited Finmark in 1849, at Reine in Lofoten I found 2 specimens, together with many of the next species, which abounds there, at the depth of 40—50 fathoms in sandy mire.

To my particular description of this species in the work above named, I will here make the following addition:

Specimens from all the three localities noticed are exactly similar.

The number of tentacles appears, as already remarked, to vary with the age. In the largest specimens there are 40—50 of the lower and longer tentacles standing in a single row or circle; in smaller specimens there are fewer.

The reproductive stalks (fig. 26) 15—20 in number, are distinguishable from those of the next species by their relatively greater length, which is equal to one third of the length of the lower tentacles, and by their slender and ramified form. They are cylindrical or filiform, but somewhat thicker at the base, tapering gradually towards the extremity, and having on each side 3—4 alternate branches *(b)* of similar form, distant from each other; the interior or lower branches being smaller; the upper branches, which are sometimes bipartite, being larger. The numerous and generally very small gonozooids *(c)* which are relatively much smaller than in the other species, are closely accumulated at the extremity of these branches, and are of very different size, from that of a bud scarcely visible to the naked eye, to $\frac{1}{2}$—$\frac{2}{3}$ M. m. in length, according to their lesser or greater degree of development.

have en fuldkommen Meduseform (Fig. 27, 28), idet deres Skive eller Kappe (*p*), som er ganske gjennemsigtig med et svagt blegrødligt Anstrøg, er klokkeformig, næsten dobbelt saa lang som bred, fortil eller i den ydre bredere Ende noget skjævt afstudset, bagtil conisk eller efterhaanden smalere og gaaende over i en kort cylindrisk Stilk (*s*), ved hvilken den er fæstet til den gemmebærende Gren. Rundt om Kappens forreste, noget firkantede, skjævt afstudsede Rand sidde i lige Afstand fra hverandre 4 fremragende Knuder (Tentakelbulbi) af mørk rosenrød Farve. De 3 af disse Knuder (*d*) ere kugleformige og af lige Størrelse, medens den fjerde (*e*), som sidder paa den mest fremragende Del af den skjæve Kapperand, er dobbelt saa stor og forlænget til et smalere, cylindrisk i en lidt tykkere rund Knop (*f*) endende Vedhæng, som er mere end halvt saa langt som Kappen og aabenbart maa betragtes som en fremvoxende Tentakel eller saakaldet Randtraad. Formodentlig har denne Randtraad, som her er beskrevet efter Spiritusexemplarer, i levende Live været meget længere. Den staar iøvrigt aldrig lige ud eller lodret paa Kapperanden, men altid noget skraat udad rettet, saa at den danner en Vinkel med denne.

Fra hver af de 4 Randknuder (Tentakelbulbi) løber en af talrige meget smaa Pigmentkorn rødlig farvet Canal (*c*) langs ad Kappens indre Flade bagtil hen til Basis af den store ovale eller flaskeformige mørkrødlige Mave (*b*) (Proboscis, Manubrium), der ligesom Kolben i en Klokke rager frit frem i Kappens Hule (Svømmehulen), som den ikke er meget langt fra at udfylde, og kun befæstet bagtil ved dens noget smalere Basis. En Ringcanal (*g*) langs ved Kappens forreste Rand forbinder hine 4 Radiærcanaler med hverandre, og disse communicere bagtil med Mavens Hule og den derfra ind i Stilken, ved hvilken Gemmen er befæstet, løbende Canal ("chord" Forbes), gjennem hvilken Gemmen tilføres den til dens Ernæring fornødne Vædske fra den gemmebærende Grens Hule. Alle 4 Randknuder indeholde en Hule, som communicerer saavel med Ringkanalen som med Radiærkanalerne og ligeledes strækker sig ind i den forlængede Randtraad. I Huden af disse Knuder findes ogsaa talrige runde Nesselkapsler indleiede. Paa den frie Ende af Maven var endnu ingen Mundaabning at bemærke.

Saaledes vare de største, mest udviklede Gemmer (Fig. 27, 28 *a''*), hvilke hyppig viste selvstændige acalephagtige Bevægelser, en oftere gjentagen hæftig Systole og Diastole af Kappen for at løsrive sig og blive fri. Den eneste Randtentakel var her, som man ser, mere udviklet end hos de af mig forhen (l. c., Tab. 1, Fig. 3, f, g) iagttagne og afbildede Medusegemmer. De mindre Gemmer (Fig. 28, a') viste kun en enkelt ganske kort, tyk og but tilrundet Knude (den fremvoxende Randtraad) paa Kappens forreste Rand og endnu intet Spor til de 3 övrige Knuder, og de mindste (*a*) (10—15 Gange mindre end hine mest

They have a complete Medusa-form (fig. 27, 28); their disc or umbrella *(p)* which is quite transparent, with a slight pale reddish tint, being bell-shaped, nearly twice as long as wide; in front, or at the wider extremity, somewhat obliquely terminated, and conical behind, or gradually tapering to a short cylindrical stalk *(s)* by which it is attached to the reproductive branch. Round about the anterior somewhat square obliquely terminated border of the mantle, there are 4 equidistant prominent tubercles (tentacle-bulbs) of a dark rose color. Three of these tubercles *(d)* are globular and of equal size, while the fourth *(e)*, situated on the most prominent part of the oblique border of the umbrella, is twice as large, and lengthened out to a thinner cylindrical appendage, which terminates in a round knob *(f)* and is more than half as long as the umbrella, appearing clearly as a growing tentacle or so-called marginal filament. Probably this marginal filament, which is here described according to a spirit specimen, was much longer in the living animal. It never stands straight out, or perpendicularly on the border of the umbrella, but always somewhat inclined outwards, so as to form an angle with it.

From each of the 4 marginal tubercles (tentacle-bulbs) there is a canal *(c)*, tinted red by numerous very small pigmentary granules, running along the interior surface of the umbrella to the base of the large oval or bottle-shaped dark reddish stomach *(b)* (proboscis manubrium), which, like the clapper of a bell, projects freely in the cavity of the umbrella very nearly filling it, and is only fixed at the somewhat more slender base. A circular canal *(g)* around the anterior border of the umbrella connects the 4 radial canals with each other; these communicate with the cavity of the manubrium and with the canal ("chord" Forbes) that runs thence into the stalk to which the gonozooid is attached, conveying from the cavity of the reproductive branch, the liquid required for the nourishment of the gonozooid. All the 4 marginal tubercles contain a cavity, which communicates with the circular canal as well as with the radial canals, and likewise extends into the elongated marginal filament. Numerous round thread-cells are also found imbedded in the skin of these tubercles. At the free extremity of the manubrium no oral aperture could yet be perceived.

Such were the first and most developed gonozooids (fig. 27, 28 a'') which frequently showed independant acalephic movements, a more frequently repeated violent systole and diastole of the umbrella in order to disconnect themselves and to become free. The single marginal tentacle was here, as may be seen, more developed than in the gonozooids previously observed and delineated by me (l. c., Tab. 1, fig. 3, f. g.) The smaller gonozooids (fig. 28. a') showed only a single tubercle quite short, thick and obtusely rounded (the growing marginal filament) on the anterior border of the umbrella, and no

udviklede) vare simpelt ovale uden Aabning paa Kappens forreste Ende og uden Spor af Knuder.

Af de her anførte Iagttagelser, hvilke ganske stemme overens med mine tidligere i Aaret 1835 publicerede, synes det utvivlsomt, at de af Corymorpha nutans opammede Medusegemmer udvikle sig til en Art af den af Forbes opstillede Meduseslægt Steenstrupia. Denne characteriseres nemlig af ham (Monograph of the British naked-eyed Medusæ, pag. 72) ved "en conisk tilspidset Kappe (Umbrella), 4 simple Radiærkar, som fortil ende i 4 Randknuder, fra den ene af hvilke en enkelt Tentakel er udviklet; Maven (Pedunculus) snabelformig, med en simpel rund Aabning".

Den af Forbes anførte Character, at "Apex of Umbrella er forbunden med Subumbrella ved en Streng (chord)" kan vel ikke tillægges nogen videre Betydning, da denne Streng, en Levning af Forbindelsescanalen med Ammedyret, af hvilket Medusen blev opfostret, senere absorberes.

Med disse Characterer stemme nu de af Corymorpha nutans opammede Medusegemmer fuldkommen overens, alene med Undtagelse af, at Mundaabningen endnu fattes dem. Det er endog ikke usandsynligt, at de, løsrevne fra Ammedyret, udvikle sig til den af Forbes under Navnet Steenstrupia rubra (l. c., Tab. 13, Fig. 1.) beskrevne Art.

2. *CORYMORPHA SARSII,* Steenstrup.

(Tab. 2, Fig. 18—24, Tab. 4, Fig. 9—23.)

Corymorpha nutans, Sars Reise i Lofoten og Finmarken, Nyt Mag. f. Naturvid., 1850, Vol. 6, pag. 135.

Corymorpha Sarsii, Steenstrup i Meddelelser fra den naturh. Forening i Kjøbenhavn, 1854, pag. 48.

Corymorpha Sarsii, Sars, Chr. Vid. Selsk. Forhandl., 1859, pag. 98.

Denne paa min første nordlandske Reise i 1849 opdagede Form er hidtil kun funden i Vestfjorden ved Lofoten, hvor den forekommer temmelig hyppig paa fra 12 indtil 50 F. D., Sandbund eller sandblandet Lerbund.

Den er, som nøiere Undersøgelser have vist mig og som min Ven Steenstrup formodede, ganske vist en fra C. nutans forskjellig Art, skjøndt den ligner denne overmaade meget i sit hele ydre Udseende.

Corymorpha Sarsii synes ikke at opnaa en saa betydelig Størrelse som C. nutans. De største af mig iagttagne Exemplarer havde kun en Længde af $2\frac{1}{2}$—3″. Antallet af de nederste Tentakler var ogsaa ringere, nemlig kun 30—40 (Sml. Tab. 2, Fig. 18.)

De gemmebærende Stilke (Fig. 19, 20) ere ialmindelighed hos denne Art forholdsvis langt kortere ($\frac{1}{5}$—$\frac{1}{6}$ af de nederste Tentaklers Længde), og deres Antal ringere end hos C. nutans; hos et $2\frac{1}{2}$″ langt Individ fandtes saaledes kun 10 saadanne, af hvilke 8 større og mellem dem 2 meget mindre. De ere først i deres ydre Ende delte eller besatte med et Par meget korte Grene, som bære de kun lidet talrige Medusegemmer, hvilke saaledes danne en tæt rundagtig Klynge.

trace yet of the 3 other tubercles; and the smallest *(a)* (10—15 times less than those most developed) were simply oval, without aperture at the anterior extremity of the umbrella, and without any trace of tubercles.

From the observations here quoted, which entirely coincide with my own published previously in the year 1835, it appears undoubted that the Gonozooids fostered by the Corymorpha nutans develop themselves to a species of the Medusa-genus Stenstrupia established by Forbes. He characterises this genus (Monograph of the British naked-eyed Medusæ, page 72) by "a conically pointed umbrella 4 simple radial vessels terminating in 4 marginal tubercles, from one of which a single tentacle is developed; the manubrium (pedunculus), proboscidiform, with a simple circular aperture."

The characteristic cited by Forbes that "the apex of the umbrella is connected with the sub-umbrella by a chord", must probably be considered as unimportant; because this chord, a remnant of connexion with the parent animal, is afterwards absorbed.

The gonozooids fostered by the Corymorpha nutans coincide perfectly with these characteristics, excepting only that the oral aperture is still wanting. It is even not improbable that, when disconnected from the parent animal, they may develope themselves into the species described by Forbes under the name of Steenstrupia rubra (l. c., Tab. 13, fig. 1.)

2. *CORYMORPHA SARSII,* Steenstrup.

(Tab. 2, fig. 18—24, Tab. 4, fig. 9—23).

Corymorpha nutans, Sars „Reise i Lofoten og Finmarken", Nyt Mag. f. Naturvid., 1850, Vol. 6, page 135.

Corymorpha Sarsii, Steenstrup in „Meddelelser fra den Naturh.-Forening i Kjøbenhavn", 1854, page 48.

Corymorpha Sarsii, Sars, Chr. Vid. Selsk. Forhandl., 1859, p. 98.

This form, discovered during my first visit to Nordland in 1849, has hitherto been found only in Vestfjorden near the Lofoten islands, where it occurs rather abundantly in 12—50 fathoms on sandy bottom or clay mixed with sand.

It is, as more minute research has convinced me, and as my friend Steenstrup supposed, without doubt a different species from the C. nutans, although it resembles it very much in its whole external appearance.

Corymorpha Sarsii does not appear to attain so considerable a size as C. nutans. The largest specimens observed by me had only a length of $2\frac{1}{2}$—3″. The number of the lower tentacles was also smaller, namely only 30—40 (comp. Tab. 2, fig. 18).

The reproductive stalks (fig. 19, 20) are usually in this species relatively much shorter ($\frac{1}{5}$—$\frac{1}{6}$ of the length of the lower tentacles) and they are also fewer than in the C. nutans; in a specimen $2\frac{1}{2}$″ long there were only 10, of which 8 larger, and among them 2 much smaller. They are, at their extremities only, divided, or furnished with a few very short branches bearing the not very numerous gonozooids which form thus a thick roundish cluster.

Det er især ved dens Medusegemmers (Fig. 21—24) betydelige Størrelse og særegne Form, at C. Sarsii adskiller sig fra de andre af mig iagttagne Arter af Slægten. De mest udviklede af dem have nemlig en Længde af 2—3 M.m. De mindste (Fig. 19, 20, 21, a.) ere overmaade smaa Knopper (neppe $\frac{1}{10}$ M.m. lange) af oval Form med simpel tilrundet ydre Ende, og med den indre eller nedre Ende befæstede ved en smalere, men dog temmelig kort og tyk Stilk; Kappen ligger hos dem endnu tæt op til den store ovale Mave (Manubrium). Andre (Fig. 19, 21, a′) dobbelt saa store eller endnu større, ere mere langstrakte og vise paa den ydre Ende 4 meget smaa runde Knuder. Atter andre (Fig. 19—21, a″), 2—3 Gange større eller 1—$1\frac{1}{2}$ M.m. lange, ere forholdsvis mindre smale og befæstede ved en længere og tyndere cylindrisk Stilk (*s*). Den gjennemsigtige vandklare Kappe (*p*) har nu hævet sig fuldstændigt af fra Maven og er klokkeformig med jevnt tilrundet Kuppel (ikke conisk som hos C. nutans), dobbelt saa lang som bred, og dens ydre lige afskaarne Ende besat med 4 ligestore og i lige Afstand fra hverandre rundt om Randen staaende fremragende kuglerunde Knuder (*d*). Fra hver af disse Knuder løber en linieformig Canal (*c*) langs ad den indre Flade af Kappen hen til Mavens Basis, og en lignende ringformig Canal rundt om Randen forbinder alle 4 Knuder med hverandre. Disse Canaler ere det samme Karsystem, de 4 Radiærkar og Ringkarret, som vi fandt det hos Gemmerne af forrige Art og som er saa characteristiskt for Medusetypen. De 4 Knuder ere Begyndelsen til de fremvoxende Tentakler eller Randtraade. Maven (*b*), som nu er pæreformig eller tykkere ved Basis og smalere i den frie Ende, har trukket sig langt tilbage fra Kappen og er kun halvt saa lang som denne; det derved mellem begge dannede Hulrum (Svømmehulen) aabner sig udadtil paa Gemmens ydre Ende med en stor cirkelrund Aabning, som er garneret med en horizontal tynd ringformig Hud, den hos alle lavere Meduser (Cryptocarpæ Esch., Gymnophthalmata Forb., Craspedota Gegenb.) vel bekjendte saakaldte Randhud (Diaphragma, Velum Forb.), som spiller en saa stor Rolle ved Locomotionen.

Hos de største iagttagne Medusegemmer (Fig. 23, 24) endelig, hvilke ere dobbelt saa store som de nys omtalte eller 2—$2\frac{1}{2}$ M.m. lange, 1—$1\frac{1}{4}$ M.m. brede, og befæstede ved en temmelig lang og meget tynd cylindrisk Stilk (*s*), som indslutter det til Mavens Grund gaaende Ernæringskar, ere de 4 Randknuder (*d*) eller fremvoxende Randtraade noget mere forlængede, ovale eller ganske kortkølleformige, og Maven (*b*) mere cylindrisk og meget større, idet den ikke er meget langt fra at udfylde Svømmehulen og rækker med dens ydre, smalere eller noget indknebne og tilrundede frie Ende (*h*), paa hvilken endnu ingen Mundaabning er synlig, lige til eller endog et kort Stykke udenfor Kappens Aabning (Fig. 23). Iøvrigt viser Maven en efter dens ydre Conturer dannet Hule fyldt med en overmaade finkornet Materie (Ernæringsvædsken), som ogsaa fylder det hele Karsystem og i levende Tilstand er i en bestandig circulærende Bevægelse. — Kappen er, ligesom

It is especially by the size and peculiar form of the gonozooids (fig. 21—24) that C. Sarsii is distinguished from the other species of this genus observed by me. The most developed of them are 2—3 M.m. long. The smallest (fig. 19, 20, 21, a) are excessively small buds, (scarcely $\frac{1}{10}$ M.m. long) of oval form, simply rounded at the exterior, and with the interior or inferior extremity attached to a somewhat more slender and rather short stem; the umbrella still fits closely around the large oval stomach (manubrium). Others (fig. 19, 21, a) twice as large, or still larger, are more elongated, and shew at the outer extremity 4 very small round tubercles. Others again (fig. 19, 21, a″) 2—3 times larger or 1—$1\frac{1}{2}$ M.m. long, are relatively thicker and attached by a longer and more slender cylindrical stalk *(s)*. The hyaline umbrella *(p)* has now separated itself completely from the manubrium and become bell-shaped, with a regularly rounded cupola (not conical as in C. natans) twice as long as wide, the outer extremity evenly truncated, bearing 4 equidistant globular tubercles of equal size *(d)* situated around the margin. From each of these tubercles there runs a linear canal *(c)* along the interior surface of the umbrella to the base of the manubrium; and a similar circular canal round the margin connects all the 4 tubercles with each other. These canals form (the 4 radial vessels and the circular vessel), the same vascular system, as we found in the gonozooids of the former species, and characteristic of the Medusa-type. The 4 tubercles are the commencement of the growing tentacles or marginal filaments. The manubrium *(b)* which is pear-shaped or thicker at the base and thinner at the free end, has retired far away from the umbrella and is only half as long as the umbrella is; the cavity thereby formed between them (the swimming cavity) has a large circular opening bordered with a thin annular membrane, the so-called marginal membrane (Diaphragma, Velum Forb.) well known in all the lower Medusæ (Cryptocarpæ Esch. Gymnophthalmata Forb. Craspedota Gegenb.) and which plays so great a part in the locomotion.

Finally in the largest gonozooids observed (fig. 23, 24) which are twice as large as the last mentioned, or 2—$2\frac{1}{2}$ M.m. long, 1—$1\frac{1}{4}$ M.m. wide, and attached by a rather long and very thin cylindrical stem *(s)* inclosing the alimentary vessels that lead to the bottom of the manubrium, the 4 marginal tubercles *(d)* or the incipient marginal filaments are somewhat more elongated, oval or shortly club-shaped, and the manubrium (*b*) more cylindrical and much larger, almost filling up the swimming cavity, and extending with its outer free extremity *(h)* (which is more slender or somewhat constricted and rounded, and on which no oral aperture is yet apparent), quite up to the opening of the umbrella (fig. 23) or even a little beyond it. Moreover the manubrium shews a cavity, of similar form to its exterior contour, filled with an extremely finely granulated matter (the alimentary liquid) which also fills the whole vascular system, and in the

hos de før omtalte yngre Gemmer, ganske farveløs og vandklar, Maven og Randknuderne samt alle Kar opak hvide. Paa Randknuderne saavelsom paa den smalere frie Ende af Maven (Mundpartiet) bemærkedes talrige rundagtige Nesselkapsler, af hvilke udkom en meget lang og fin lige eller børsteformig Nesseltraad.

Hos alle disse største eller mest udviklede Medusegemmer bemærkedes af og til selvstændige og livlige Bevægelser af Kappen, en Systole og Diastole ligesom for at løsrive sig fra deres Ammedyr. Hyppig trak Kappen sig ogsaa sammen i longitudinal Retning, hvorved den blev saameget bredere, og hvorved den ydre Halvdel af Maven straktes frem udenfor Kappens Aabning (Fig. 24). Generationsorganer bemærkedes ikke hos nogen af disse Gemmer.

I Sommeren (Midten og Slutningen af Juni) 1866 observerede min Søn denne Art ved Fiskeværet Skraaven i Lofoten, hvor den forekommer i stor Mængde paa en enkelt Localitet, 12—20 F. D. grov Sandbund, (Tab. 4, Fig. 9—23). De største Exemplarer vare $3\frac{1}{2}$" lange, altsaa betydelig større end de af mig ved Reine iagttagne, med hvem de forresten paa det nøieste stemmede overens. De mindste fundne Individer, der vare 5 M.m. lange, havde endnu ingen Gemmer; derimod vare disse allerede tilstede paa Individer af 10 M.m. Længde, men kun faa i Antal, skjøndt forholdsvis ret store (de største vare $1\frac{1}{2}$ M.m. lange). Gemmestilkenes Tal varierede hos de forskjellige Individer efter Størrelsen og gik hos de største op til mere end 24, hvoraf dog 6—10 vare meget smaa og uregelmæssigt stillede mellem de større. Disse sidste vare forholdsvis betydeligt længere end hos de af mig ved Reine iagttagne Individer, idet enkelte af dem opnaaede den anseelige Længde af 12 M.m., og havde undertiden foruden Endegrenene en liden accessorisk Gren paa Midten af deres Længde (Fig. 9). Gemmerne selv vare talrigere og ogsaa viderekomne end de af mig iagttagne, de største indtil 4 M.m. lange, og, hvad der var af stor Interesse, de indeholdt hos de fleste Individer tydeligt udviklede Generationsstoffe. — Alle Medusegemmer paa en Amme vare altid af ens Kjøn. Hungemmerne kjendes let ved den større Gjennemsigtighed af deres Manubrium og dettes bleg rosenrødlige Farve, som hidrører fra de sig udviklende Æg. Hangemmerne ere kjendelige ved deres opake, hos nogle brunrødlige, hos andre lysegule Manubrium; Spermatozoiderne (Fig. 22), som udvikles i Væggene af Manubrium, ere overmaade smaa, med oval Krop og ikke meget lang traaddannet Hale, og bevæge sig meget livligt.

Manubrium (*b*) er hos de udviklede Hangemmer (Fig. 21, 23) noget længere end hos Hungemmerne (Fig. 10—12) og rækker et lidet (Fig. 21), ofte ogsaa et langt Stykke (Fig. 23), udenfor Aabningen af Kappen, hos Hungemmerne derimod i det høieste til denne Aabning, ikke udenfor

living animal is in a constant state of circulation. The umbrella is, as in the younger germs above mentioned, quite colorless and pellucid; the manubrium, the marginal tubercles and all the vessels are opaque white. On the marginal tubercles, as well as on the thinner free end of the manubrium (the oral part) there were numerous roundish thread-cells, from each of which issued a very long and fine straight bristle-like urticary filament.

In all these largest or most developed gonozooids spontaneous and animated movements of the umbrella were occasionally observed; a systole and diastole as if with the object of separating themselves from the parent animal. Frequently also the umbrella was contracted in a longitudinal direction, whereby it became so much wider, and whereby the outer half of the manubrium became protended beyond the aperture of the umbrella (fig. 24). No organs of generation were observed in any of these germs.

In the summer of 1866 (in the middle and latter part of June) my son observed this species at the fishing-place Skraaven in Lofoten, where it occurs very abundantly in one single locality at the depth of 12—20 fathoms on coarse sand (Tab. 4, fig. 9—23). The largest specimens were $3\frac{1}{2}$" long, that is much larger than those which I observed at Reine, but otherwise agreeing most minutely with the same. The smallest specimens found, which were 5 M.m. long, had not yet any gonozooids; while those of 10 M.m. length had gonozooids, few in number though relatively large, (the largest of these were $1\frac{1}{2}$ M.m. long). The number of the reproductive stalks varied in different individuals according to size; the largest specimens having as many as 24 stems, whereof however 6—10 very small and irregularly distributed among the others, which latter were much longer in proportion than the stems of the specimens observed by me at Reine, some few of them even attaining a length of 12 M.m. and having, besides terminal branches, a small accessory branch in the middle of their length (fig. 9). The gonozooids themselves were more numerous, and also more advanced than those observed by me; the largest being as much as 4 M.m. long, and — what was of great interest — containing in most of the specimens plainly developed generative elements. All the gonozooids on one parent stem were always of one and the same sex. The females are easily known by the greater transparency of their manubrium, and by its pale rose color attributable to the development of the ova. The males are recognisable by their opaque, in some reddish brown, in others light yellow manubrium; the spermatozoides (fig. 22) developed in the walls of the manubrium are excessively small, with an oval body and a not very long filiform tail; they move very actively.

The manubrium (*b*) is in fully developed male gonozooids (fig. 21—23) somewhat longer than in the female gonozooids (fig. 10—12) and extends a little (fig. 21) often even considerably (23) beyond the aperture of the umbrella; while in the female gonozooids it reaches, at the

den. Æggene (Fig. 20), som udvikle sig i Væggene af Manubrium, ere kun faa i Antal, men forholdsvis meget store samt af en bleg rosenrødlig gjennemsigtig Farve. De første Anlæg til Æg (Fig. 10—12 og Fig. 13—16) vise sig paa en meget mærkværdig Maade skivedannede eller fladt udbredte, med Peripherien udgaaende i mere eller mindre talrige Udløbere eller Lappe, der ofte ere tvedelte, altsaa af en uregelmæssig Form, lignende mange Amoeber, med en lysere kugledannet Kjærne (Kimblæren) i Centrum eller noget nærmere den ene Side. Senere, som det synes, trække de sig mere sammen (Fig. 16—18), idet de blive tykkere og Lappene færre, kortere og bredere, og ende med at antage en kuglerund Form (Fig. 20), i hvis Indre Kjærnen eller Kimblæren ikke længere er synlig, og rage da høit frem over Manubriums Overflade ligesom Bær (se Fig. 11), formodentlig fæstede ved en kort Stilk, som i et Tilfælde bemærkedes hos et løsrevet Æg (Fig. 19). Denne Contraction af Protoplasmaet (som man maa antage er Æggets Indhold) maa finde Sted meget langsomt, da den ikke af Øiet kunde bemærkes.

Æggene af C. Sarsii ere saaledes Celler uden Cellemembran eller blotte nøgne, homogene Plasmaklumper eller Skiver, der hver indslutter en kugledannet Kjærne. De ere i denne Tilstand extensible og contractile; thi kun ved at antage en saadan Contractilitet (som vistnok endnu ikke directe er observeret) blive de mangfoldige Formforandringer, som de vise, forstaaelige. Analoge Formforandringer eller amoebeagtige Bevægelser har man, som bekjendt, iagttaget hos visse dyriske Celler, nemlig Lymphelegemerne i Blodet, enkelte Bindevævsceller, Hjertecellerne af Embryoner o. a. Bevægelser af Blommen iagttoges i Ægget af Gasterosteus (Ransom) og Gjedden (Reichert), i Furingskugler af Frøen (Ecker), i Cellerne af Planarieembryonet (v. Siebold og Kölliker); og Bischoff saa Rotationer af den hele Blommemasse i Kanin- og Marsvinægget. Endelig bemærker Kölliker (Icones histiologiæ, 1ste Afd., pag. 50, Tab. 8, Fig. 3) om nogle Spongier: „meget eiendommelige ere de hos Dunstervillia, Nardoa og Ancorina sete flerfoldige Udløbere af Æggene, der give dem Udseende af multipolare Ganglieceller, og maaske hænge sammen med Æggenes Bevægelsesphænomener i levende Live“. Denne sidste Iagttagelse af Kölliker er den eneste, jeg har kunnet finde, der synes at staa i nogenlunde Samklang med det ovenbeskrevne iagttagne mærkværdige Forhold ved Æggets Udvikling hos C. Sarsii. Köllikers Figurer vise imidlertid tynde, tilspidsede, simple eller 1—2 Gange dichstomisk delte Udløbere. Hos Corymorpha ere disse af en bredere, i Enden tilrundet og mangfoldigen og mere uregelmæssig Form. — Efter nogen Tid drage de amoebeagtige Forlængelser af Blommen hos C. Sarsii sig ind, Blommen bliver tykkere eller concentrerer sig alt mere og mere og bliver omsider kugleformig og dens Overflade glat; samtidig begynder den at hæve sig frem over Manubriums Overflade ligesom et Bær,

very most, only to (never beyond) this aperture. The ova (fig. 20) which develop themselves in the walls of the manubrium are only few in number, but proportionally very large and of a pale transparent rose color. The first indications of the ova (fig. 10—12, o, fig. 13—16) shew themselves in a very remarkable manner as thin discs with a periphery bordered by more or less numerous processes or lobes which are frequently divided, being thus irregular in form and resembling many Amoebæ, with a lighter globular nucleus (the germinal vesicle) in the centre, or somewhat more on one side. It appears that they afterwards contract themselves more (fig. 16—18) becoming thicker, with fewer shorter and wider lobes, and finally assuming a globular form (fig. 20) wherein the interior nucleus or germinal vesicle is no longer visible; in this state they project far above the surface of the manubrium like berries (see fig. 11) probably attached by a short stem which in one case was remarked on a detached ovum (fig. 19). This contraction of the protoplasma (as which the contents of the ovum may be regarded) must take place very slowly; for it was not observable to the eye.

The ova of C. Sarsii are therefore cells without any cellular membrane, or merely naked homogeneous plasmatic masses, or discs, each of which contains a globular nucleus. They are in this state extensile and contractile; for it is only by assuming the existence of such contractility (which has certainly not yet been directly observed) that it becomes possible to account for the manifold mutations of form which they exhibit. Analogous mutations or Amoeba-like movements have been observed, as is well known, in certain animal cells, namely in the lymph-globules of the blood, in some connecting-tissue-cells, in the cells of the heart in embryos &c. Movements of the yolk have been observed in the ova of the Gasterosteus (Ransom) and of the Pike (Reichert), in segmentation-globules of the spawn of the Frog (Ecker), in the cells of the embryos of Planaria (v. Siebold & Kölliker); Bischoff noticed rotations of the whole mass of the yolk in the ovum of the rabbit and guinea-pig; and lastly Kölliker remarks (Icones histiologiæ, Part 1, p. 50, Tab. 8, fig. 3) concerning some sponges: “The multifarious off-shoots observed on the ova of Dunstervillia Nardoa and Ancorina are very peculiar, and give them the appearance of multipolar ganglion-cells; possibly they may also stand in connexion with the phenomena of movement in the eggs during life.” The last observation of Kölliker is the only one I have been able to find that appears in any way to coincide with the remarkable development of the egg in C. Sarsii as above described. Kölliker's figures shew however thin, pointed, simple or once or twice dichotomically divided processes. In the Corymorpha these are wider, more rounded at the extremity, more various and of more irregular shape. After some time the Amoeba-like elongations of the yolk in the C. Sarsii retract themselves, the yolk becomes denser and more

der sidder fast ved en kort og tynd Stilk, for tilsidst sandsynlig at løsrive sig og falde ud i Vandet.

Medusegemmernes 4 Randtentakler (*d*) vare i Regelen rudimentære, knop- eller lidt kølleformige og alle af samme Størrelse; kun hos en eneste Gemme (Fig. 12) bemærkedes den ene Tentakel (*d'*) allerede at have forlænget sig betydeligt, idet den havde antaget en traaddannet d. e. ved Basis tykkere og imod Spidsen efterhaanden tyndere Form. Umbrella viste hos alle større Gemmer livlige Bevægelser af Systole og Diastole, og naar en af dem kunstig afløstes, svømmede den en Tid lang frit omkring i Vandet paa Medusernes sædvanlige Vis. Undertiden, især naar Gemmerne vare nærved at dø, trak Umbrella sig stærkt sammen i Længderetning, hvorved Manubrium traadte mere frem (indtil Halvdelen af dens Længde) udenfor Aabningen af samme. Kappen var aldeles farveløs og vandklar; paa Subumbrella bemærkedes, især under Systolen, talrige overmaade fine parallelle Tværstriber, udentvivl Muskelfibre. Manubrium var indvendig, d. e. i dens Hulhed, lys gulagtig (straagul), Tentakelrudimenterne bleg rødlige. Paa den forsmalede, et kort Rør lignende Ende af Manubrium (*h*) syntes der allerede at være en cirkelformig Aabning, Munden. I Diaphragma eller den tynde ringdannede Hud ved Aabningen af Kappen (*g*) bemærkedes radiære Muskelfibre. Denne Hud slaaes ved Diastole udenfor og ved Systole indenfor Aabningen af Kappen.

Skjøndt man ifølge disse Iagttagelser vel kunde nære nogen Tvivl, om Medusegemmerne hos C. Sarsii nogensinde løsrive sig, da de allerede medens de ere fæstede til Moderdyret producere Æg og Sperma, synes dog paa den anden Side deres fuldstændig meduselignende Bygning heller at tale for, at de dog virkelig tilsidst løsrive sig fra Moderdyret og blive til frie Meduser. I saa Tilfælde synes de imidlertid ikke saaledes som Gemmerne af foregaaende Art at udvikle sig til nogen Art af Slægten Steenstrupia, men heller til en Art Sarsia, Oceania eller en anden lignende med ligelig udviklede Randtraade forsynet Slægt af de lavere Meduser.

3. *CORYMORPHA ANNULICORNIS*, M. Sars.

(Tab. 1, Fig. 17—3.)

Sars, Christ. Vid. Selsk. Forhandl., 1859, pag. 99.

Denne lille, meget distincte Form, som jeg ikke uden nogen Tvivl henfører til Corymorphaslægten, fandt jeg for mange Aar siden (i Juni 1836) ved Florøen i Søndfjord, Bergens Stift, paa 30—40 F. D., dyndet Grund, i 2 Exemplarer.

Jeg har saalænge udsat med Bekjendtgjørelsen af den Beskrivelse, jeg da udkastede og som vistnok lader meget

and more concentrated, becoming at last globular with a smooth surface; at the same time it begins to raise itself over the surface of the manubrium, like a berry attached by a short and thin stem, whence it finally detaches itself and falls off in the water.

The 4 marginal tentacles (*d*) of the gonozooids were, as a rule, rudimentary, bud-like or somewhat claviform, and all of the same size; only in one single gonozooid (fig. 12) the one tentacle (*d*) was observed already to have elongated itself considerably, having assumed a thread-like form thicker at the base, and gradually thinner towards the extremity. The umbrella in all the larger gonozooids exhibited active movements of systole and diastole and when one of them was artificially detached, it swam freely about in the water for a long time, as the medusæ do usually. Sometimes, especially when the gonozooids were about to die, the umbrella contracted itself strongly in a longitudinal direction, which caused the manubrium to project further (until the half of its length) beyond the aperture. The umbrella was quite colorless and pellucid; on the sub-umbrella, especially during the systole, there appeared numerous extremely fine parallel transverse stripes, without doubt muscular fibres. The manubrium was internally, that is in its cavity, of a light yellowish (straw) color; the rudimentary tentacles pale reddish. On the contracted end of the manubrium (*h*), which resembled a short tube, there appeared to be already a circular opening, the mouth. In the diaphragm, the thin annular membrane at the aperture of the umbrella (*g*), radial muscular fibres were observed. This membrane is in the diastole thrown outwards, and in the systole drawn within the aperture of the umbrella.

Although, according to these observations, some doubt might be entertained as to the gonozooids of the C. Sarsii ever becoming detached, seeing that they already produce ova and sperm while still attached to the parent animal, yet their complete and medusa-like structure seems on the other hand to warrant the inference that they do really at last detach themselves from the parent animal and become free medusæ. In this case it does not however appear that, like the gonozooids of the preceding species, they develop themselves to any species of the genus Steenstrupia, but rather to a species of Sarsia, Oceania or of some other similar genus of the lower medusæ furnished with uniformly developed marginal filaments.

3. *CORYMORPHA ANNULICORNIS*, M. Sars.

(Tab. 1, fig. 7—13.)

Sars, Christ. Vid. Selsk. Forhandl., 1859, page 99.

Of this small very distinct form, — which, not without some hesitation, I refer to the genus Corymorpha.— I found the first 2 specimens many years ago (in June 1836) near Floröen at Söndfjord in the province of Bergen, at the depth of 30—40 fathoms on miry bottom.

I have so long delayed publishing the description which I then sketched, and which certainly leaves much

tilbage at ønske, i Haab om at kunne ved gjentagen Iagttagelse stadfæste og complettere den; men da jeg ikke har været heldig nok til senere at gjenfinde dette Dyr, tror jeg ikke at burde undlade ved nærværende Leilighed at meddele den.

Dyret har en de forrige Arter meget lignende Form (Fig. 7, 8), uden dog at have det ombøiede eller nikkende Udseende af Køllen eller Dyrets øverste Del. Begge de iagttagne Exemplarer vare omtrent af ens Størrelse, $\frac{2}{3}$" lange, det ene fæstet med dets nederste Ende ved fine Rodtrevler (Fig. 8, b) til en rød Alge (Ptilota plumosa), det andet til noget dyndblandet Sand.

Det tynde, hudagtige, lysbrunlige, ikke synderlig gjennemsigtige Rør omgiver Dyrets cylindriske, nedentil efterhaanden noget tykkere og paa Enden conisk tilspidsede Stilk eller Stamme (*a*) (hvilken jeg desværre forsømte at undersøge nøiere, saa at jeg ikke med Bestemthed kan sige, om den har de hos de øvrige Arter forekommende characteristiske opake Længdestriber) lige op til det Sted, hvor den gaar over i den saakaldte Kølle eller egentlige Krop (*c c*). Denne er smuk minierød og har den sædvanlige coniske Form; men dens øvre Ende (*d*), hvor Munden er anbragt, er tykkere og mere tilrundet end hos de andre Arter.

Køllens midterste Del omgives af en Krands eller enkelt Rad af 20 traaddannede, imod den ydre Ende efterhaanden noget tyndere farveløse (hyaline) Tentakler, (*f f*) af omtrent den halve Stilks Længde. Disse Tentakler, som hos de andre Arter af Sl. Corymorpha ere lidet eller slet ikke contractile, kunne her ikke ubetydeligt forkortes og udmærke sig desuden ved deres zirlige ringede Udseende (Fig. 10). De omgives nemlig i deres hele Længde af talrige, i regelmæssig Afstand fra hverandre staaende Tvær-Ringe (*a*), hvilke hæve sig noget over Tentaklernes cylindriske Overflade og bestaa af lutter tæt sammen staaende meget smaa blæreformige Nesselkapsler, hvorved Ringene vise sig mørkere end deres hyaline Mellemrum. Den finere Structur af Nesselorganerne kunde jeg desværre dengang, da jeg manglede et godt Mikroskop, ikke undersøge. Hos alle de øvrige Arter af Slægten ere disse Tentakler glatte og uden Ringe.

De øvre eller korte Tentakler (Fig. 8, e e, Fig. 9), hvis Længde omtrent udgjør en Fjerdedel af Køllens Tværdiameter, ere gulrøde, forholdsvis meget tykke (ligesaa tykke som de nedre lange Tentakler), rigide (ikke contractile) og ende med en lidt tykkere med Nesselkapsler tæt besat Knop (Fig. 9, e). Deres Antal er 8—10 (hos det ene Exemplar fandtes 10, hos det andet kun 8) og de danne en Rad omkring den øvre Del af Køllen i Nærheden af Munden. Disse Tentakler afvige saaledes meget fra samme hos de øvrige norske Arter, hvor de altid ere langt talrigere, tyndere, ikke fortykkede eller Knopformige i den ydre Ende, og sidde adspredte, ikke ordnede i Rader. Paa Køllens nederste Del, langt under de lange Tentaklers Kreds, eller der, hvor hin gaar over i Stilken,

to be desired, in the hope of being able, by repeated observation, to confirm or complete it; but, not having been subsequently so fortunate as to find this animal again, I think that I ought not on the present occasion to omit communicating my description of it.

The animal has a form very much like that of the preceding species (fig. 7, 8) but without the curved or bowed appearance of the upper or thicker part of the animal. Both the specimens observed were of about the same size $^2/_3$" long: one attached at its lower extremity by fine rootlets (fig. 8—6) to a red Alga (Ptilota plumosa) the other to some sand mixed with mire.

The thin, skin-like light-brownish not very transparent tube encloses the stem or trunk of the animal (*a*) which is cylindrical, becoming gradually thicker below and terminating in a conical point. Unfortunately I neglected to examine this tube more minutely; so that I cannot say decidedly whether it has the characteristic opaque longitudinal stripes observed in the other species. The tube extends up to that part where the stem goes over into the so-called club, or proper body (*c. c.*). This is of a beautiful minium red color, and has the usual conical form; but its upper end (*d*) where the mouth is situated, is thicker and more rounded than in the other species.

The central part of the club is surrounded by a circle or single row of 20 tentacles (*f. f.*) which are filiform, gradually thinner towards the extremity, colorless (hyaline) and of about half the length of the stem. These tentacles, which in the other species of the genus Corymorpha, are very little or not at all contractile, may here be considerably shortened, and are moreover remarkable for their ornamentally ringed structure (fig. 10). They are surrounded in their whole length by numerous transverse rings (*a*) placed at regular intervals, raised a little above the cylindrical surface of the tentacle, and consisting entirely of closely congregated very small vesicular thread-cells which cause the rings to appear darker than the hyaline intervals. I was unfortunately not able at the time to examine the finer structure of the urticatory organs; not having a good microscope at hand. In all the other species of the genus these tentacles are smooth and without rings.

The upper or short tentacles (fig. 8 e e, fig. 9) the length of which is about the fourth part of the transverse diameter of the club, are yellowish red, proportionally very thick (as thick as the lower long tentacles) rigid (not contractile) terminating in a somewhat thicker knob (fig. 9 c) closely covered with thread-cells. They are 8—10 in number (in one specimen 10 were found; in the other only 8) and they form a row round the upper part of the club in the vicinity of the mouth. These tentacles differ therefore very much from those of the other Norwegian species, in which they are always much more numerous and thinner, not enlarged or knob-shaped at the extremity; and are scattered, not arranged in rows. On the lower part of the club, far below the

bemærkedes 6—8 smaa kort-cylindriske Papiller (Fig. 8, h) stillede rundtom i en Kreds.

De af denne Hydroide producerede Medusegemmer (Fig. 11—13) sidde paa det sædvanlige Sted paa Køllen tæt ovenfor de nedre eller lange Tentakler paa meget korte Stilke, omtrent som Tilfældet ialmindelighed er hos C. Sarsii. De ligne ogsaa dem af denne sidste Art med Hensyn til deres temmelig ringe Antal og forholdsvis betydelige Størrelse; i deres Form derimod ligne de mere de af C. nutans opammede, kun ere de kortere og bredere. Kappen (*p*) har nemlig Skikkelsen af en lav Klokke af ligestor Længde som Brede og med tilrundet (ikke som hos C. nutans conisk) Kuppel, som er fæstet ved en kort og tynd cylindrisk Stilk (*s*). Den er ganske gjennemsigtig med et svagt lysrødligt Anstrøg og viser de sædvanlige 4 Radiærkar (*c*) og det circulære Randkar. — I dens indre Hule (Svømmehulen) hænger den store ovale opak rødlige Mave (Manubrium) (*b*), som naar ikke langt fra hen til Kappens forreste aabne Ende. Rundtom den noget firkantede Rand af denne sidste bemærkes 4 mørke runde Pletter (Randpletter) (*d*) i lige Afstand fra hverandre; fra den ene af disse udgaar et conisk-cylindriskt, med en rund livlig orangefarvet Knop endende, hageformigt indadbøiet Vedhæng (*f*), som ikke er langtfra saa langt som selve Kappen. Aabenbart er dette Vedhæng en fremvoxende Randtraad, meget lignende den ligeledes eneste ovenfor hos Medusegemmerne af C. nutans beskrevne, hvor den dog er lige eller noget udadrettet. Spidsen eller den orangegule Knop af denne krumbøiede Randtraad, som ligner noget et Fuglenæb, vender i Gemmernes naturlige Stilling paa Køllen af Ammedyret altid nedad (se Fig. 8, g). Hos de mindre udviklede Gemmer (Fig. 13) er denne Randtraad kortere, tykkere ved Basis og endnu ikke krumbøiet. Fra de 3 andre mørke Randpletter udgaa ingen saadanne Vedhæng, ei heller bemærkes fremragende Knuder som hos Gemmerne af C. nutans.

Det er efter den beskrevne Bygning sandsynligt, at disse Medusegemmer, ligesom samme af C. nutans, udvikle sig til en Art af Slægten Steenstrupia Forbes.

Man ser af ovenstaaende Beskrivelse, at nærværende Hydroide i flere Henseender, saasom de nedre ringede Tentaklers større Contractilitet, det ringe Antal af de en enkelt Rad dannende og i en Knop endende øvre Tentakler, temmelig meget afviger fra de andre Arter af Corymorpha[1]) og nærmer sig til Tubularia, mellem hvilke

[1]) Af de tidligere beskrevne Arter staar den utvivlsomt nærmest ved den britiske *C. nana* Alder, hvem den ligner ved sin ringe Størrelse, den opreiste, ikke bøiede Kølle og de faa, korte og tykke ovale Tentakler. Den adskiller sig imidlertid blandt andet meget bestemt fra denne Art ved den eiendommelige ringede Bygning af de aborale Tentakler, der ogsaa (efter Alders Figurer at dømme) ere baade talrigere og betydelig længere og tyndere end hos denne Art, samt ved Medusegemmernes Form, hvis Randtenakel hos C. nana er langtfra saa stærkt udviklet og ikke visende

circle of long tentacles, and just where it goes over into the stem, there appeared 6—8 small shortly-cylindrical papillæ (fig. 8 h) situated all round in a single row.

The gonozooids (fig. 11—13) produced by this Hydroid are situated in the usual place on the club, just above the lower or long tentacles, on very short stems, as ordinarily in the C. Sarsii. They resemble also those of the last named species in respect of their rather small number and relatively considerable size; but in shape they are more like the offspring of the C. nutans, only shorter and broader. The umbrella (*p*) has the form of a low bell, of equal length and breadth, and with a rounded cupola (not conical as in C. nutans) attached by a short and thin cylindrical stem (*s*). It is quite transparent, with a slight pale reddish tint, and exhibits the usual 4 radial vessels (*c*) with the circular marginal vessel. In its interior cavity (the swimming cavity) is the large oval opaque reddish stomach (manubrium (*b*) extending almost to the anterior open end of the umbrella. Round about the somewhat square margin of the latter are 4 dark round spots (marginal spots) (*d*) at equal distances from each other; from one of these there proceeds a cylindro-conical appendage (*f*) terminating in a round bright-orange-colored knob, and curved inwards like a hook. This appendage is nearly as long as the umbrella itself. Evidently it is a growing marginal filament very like the (similarly single) filament described above in the gonozooids of C. nutans, where however it is straight or inclined a little outwards. The point, or the orange-yellow knob of this curved marginal filament, which looks something like a bird's beak, is always inclined downwards (see fig. 8, g) when the gonozooid is in its natural position on the club of the parent animal. In less developed gonozooids (fig. 13) this marginal filament is shorter, thicker at the base, and not yet curved. From the 3 other dark marginal spots, no such appendages proceed, neither can any prominent tubercles be observed as in the C. nutans.

According to the structure described, it is probable that these gonozooids, like those of C. nutans, develop themselves into a species of the genus Steenstrupia Forbes.

It appears from the above description that the present Hydroid differs from the other species of the genus Corymorpha[1]), in many respects. — for instance in the greater contractility of the lower ringed tentacles, and in the smaller number of the upper tentacles which terminate in a knob and form a single row — and that

[1]) It stands undoubtedly nearest to the British *C. nana* Alder, which it resembles in its small size, in the erect, not curved, club, and in the few short thick oral tentacles. It differs however decidedly from the said species, inter alia, in the peculiar ringed structure of the aboral tentacles, — which are more numerous, as well as considerably longer and thinner than in the C. nana (according to Alder's figures), and also in the form of the gonozooids, the marginal tentacle of which in the C. nana is not nearly so strongly developed, and does not exhibit the peculiar curved shape remark-

tvende Slægter den virkelig synes at danne et forbindende Led.

4. *CORYMORPHA GLACIALIS,* M. Sars.

(Tab. 1, Fig. 14—22, Tab. 2, Fig. 1—17).

Sars, Christ. Vid. Selsk. Forhandlinger, 1859, pag. 100.

Denne ved dens Medusegemmers mærkværdige og fra alle de foregaaende afvigende Form udmærkede Art er tillige den anseligste af vore nordiske Arter, idet den opnaar en Længde af indtil 5". Jeg fandt den paa min sidste nordlandske Reise i Sommeren 1857 i Varangerfjorden ved Vadsø (70° N. B.), hvor den paa 60—80 F. D. forekommer enkeltvis og meget sjeldent, men temmelig hyppig paa 80—120 F. D., blød Lerbund eller stenig Grund, fastvoxen med dens nederste Ende til Sandpartikler, undertiden ogsaa til fine røde Alger (rimeligvis Ptilota plumosa). Da jeg havde Leilighed til at anstille en nøiere Undersøgelse af denne end af flere af de foregaaende Arter, skal jeg her meddele en mere udførlig Beskrivelse af den.

Den almindelige Form af Stilken med det denne omgivende Rør, Køllen eller den egentlige Krop og begge Slags Tentakler; alt dette forholder sig ganske som hos C. nutans (se Tab. 1, Fig. 14).

Stilken (*a, a*) er nemlig cylindrisk, oventil smalere, nedadtil efterhaanden noget tiltagende i Tykkelse og tilsidst kegleformig tilspidset. Den er næsten farveløs og vandklar med hvide, ikke ganske opake, men halvgjennemsigtige, tæt ved hverandre løbende Længdestriber (*d*). Af saadanne kunde paa Stilkens øvre Del tælles 20—24, paa den nedre færre, idet nemlig af og til to og to forene sig nedadtil eller de, hvad der er det samme, dele sig gaffelformig opadtil (Fig. 14, 15, d'). De strække sig ikke ganske ned til den nederste Ende, men ophøre der, hvor Stilken begynder at afsmalnes og løbe kegleformig ud (Fig. 15, 16, a—e). Umiddelbart ovenfor dette Sted er der et hvidt Bælte, dannet af meget smaa opakhvide runde Pletter, hvilke ere stillede i parrede mere eller mindre regelmæssige Længderader, nemlig en Rad nær ved og paa hver Side af enhver af de før nævnte Længdestriber, med hvilke de staa i Forbindelse ved fine fra disse til hver enkelt Plet udgaaende Tværlinier eller Strenge (se Fig. 18, f, f).

Stilken omgives mere eller mindre af et tætsluttende, hyalint, glat, gelatinøst-hudagtigt, overmaade tyndt, men dog ret stærkt Rør (Fig. 15, 16, c, c). Hos yngre Individer strækker dette Rør, som nedentil er tilsluttet og tilrundet (Fig. 15, 16, b), sig næsten lige op til den Indsnøring, der adskiller Stilken fra Køllen (Fig. 15 viser dette Rør hos et Spiritusexemplar, hvor det ved Spiritussens Indvirkning oventil er foldet og løsnet fra Stilken, til hvilken det ligger tæt op i levende Tilstand, ligesom ogsaa Stilken paa denne Figur som paa Fig. 16 er trukket et Stykke op af Røret), hos ældre (Fig. 14) omgiver det

den eiendommelige krumbøiede Form som hos C. annulicornis. Den er nylig af Allman opstillet som Typen for en egen Slægt, *Heterostephanus* Allm. Udg. Anm.

it more nearly resembles the Tubulariæ, between which and the Corymorphœ it really seems to form a connecting link.

4. *CORYMORPHA GLACIALIS,* M. Sars.

(Tab. 1, fig. 14—22, Tab. 2, fig. 1—17).

Sars, Christ. Vid. Selsk. Forhandlinger, 1859, page 100.

This species distinguished by the remarkable shape of its gonozooids, different from all the preceding, is also the greatest of our northern species, as it attains a length of 5". I found it during my last journey to Finmark in the summer of 1857 in the Varangerfjord at Vadsø (70° N. L.) where it occurs isolatedly and very rarely in 60—80 fathoms, but rather abundantly in 80—120 fathoms, on soft clay or stony bottom, attached by its lower extremity to particles of sand, sometimes also to fine red Algæ (probably Ptilota plumosa). As I had opportunity for more minute examination of this than of several of the former species, I shall here communicate a more detailed description of it.

The ordinary form of the stem with the tube that encloses it, the club, or proper body and both sorts of tentacles, all are exactly as in the C. nutans (see Tab. 1, fig. 14.)

The stem (*a a*) is cylindrical, more slender in the upper part, gradually increasing in thickness downwards, and at last conically pointed. It is nearly colorless and pellucid, with white, not quite opaque but half transparent longitudinal stripes (*d*) running close to each other. Of these 20—24 might be counted on the upper part of the stem, and on the lower part not so many; two and two of them being occasionally united in their downward course; or, which is the same thing, some of the stripes being divided or bifurcated in their course upwards (fig. 14, 15 d'). They do not extend quite to the lower extremity, but terminate where the stem begins to taper (fig. 15—16 a—e). Immediately above this place there is a livid belt formed of very small opaque white round spots, paired, and arranged more or less regularly in longitudinal rows, close to, and on either side of the beforenamed longitudinal stripes, with which they are connected by fine transverse lines or cords (see fig. 18, f. f.) running from the stripes to each single spot.

The stem is more or less enclosed in a tightly fitting hyaline tube (fig. 15, 16, c. c.) which is smooth gelatinous, membranous, extremely thin, but yet very strong. In younger specimens this tube, closed at the lower part and rounded, (fig. 15, 16, b.) extends quite up to the constriction that separates the stem from the club (fig. 15 shews this tube, in a spirit specimen, with the upper part folded and loosened from the stem, by the action of the spirit; the stem is likewise in this figure, as in fig. 16, drawn up a little from the tube); in older specimens (fig. 14) the tube covers only the lower half or

able in C. annulicornis. C. annulicornis has lately been set up by Allman as the type of a new genus *Heterostephanus* Allm. Note of Editor.

kun den nederste halve eller tredie Del af Stilken. Jeg har aldrig seet det ganske at mangle hos nogen af de af mig undersøgte Exemplarer, saaledes som det skal være Tilfældet med C. nutans efter Forbes og Goodsir (l, c, pag. 311), som derfor ogsaa benævne det "tubulus caducus". — Dets Substants er gelatinøs og viser sig under Mikroskopet structurløs og indsluttende adspredte klare Nesselkapsler af samme Slags, dog mindre talrige end dem, vi senere skulle beskrive i Stilkens Hud. Paa dets ydre Flade bemærkes næsten altid Polythalamier (især den almindelige Planorbulina) ofte i Mængde fastsiddende.

Rørets nederste tilrundede og i Havbunden nedsænkede Del (Fig. 14—17, b) er besat med talrige fine Traade (Fig. 16, m) ligesom Rodtrevler, ved Hjælp af hvilke det er fæstet til Sandkorn eller Alger. Disse Traade ere vel bøielige, men dog af en temmelig fast og hornagtig eller sandsynligvis chitinagtig Beskaffenhed. Ved nøiere Undersøgelse bemærker man, at de egentlig have deres Udspring eller voxe ud fra selve Stilken og det fra de ovenomtalte smaa runde parrede Længderader af opakhvide Pletter (Fig. 17, k. m, Tab. 2, Fig. 14, k. m). Af disse, som under Mikroskopet sees at indeholde mørke runde Korn (Tab. 2, Fig. 14) (Celler?), befindes en Del af de nederste at forlænge sig conisk (*k*) og rage frem over Stilkens Hudflade, derefter trænge igjennem Røret og forlænge sig mere og mere udenfor dette (*m*), idet de blive tyndere eller traadformige og endelig med deres ydre Ende befæste sig eller voxe fast til fremmede Legemer (Sandkorn eller Alger) (*m'*). Der findes mellem Dyrets Stilk og det omgivende Rør ingen anden Forbindelse Sted end den ved disse Traade formidlede, og endogsaa denne synes meget snart at ophøre, idet de sidstes Forbindelse med Stilken rumperer, hvilket kan sluttes deraf, at man med største Lethed kan trække Dyret ud af sit Rør. De talrige øvre runde Pletter, synes at være Mærker af saadanne tidligere Forbindelser.

Røret er aabenbart en af Stilkens Hud secerneret (udskilt) Dannelse, som i dens gelatinøse Substants har optaget de af hin afstødte Nesselkapsler. Det kan ikke vel paralleliseres med Tubulariernes og andre Hydroiders stive Rør, som bestaar af Chitin og overalt er forvoxet med Dyret, det omhyller; men finder sin fuldkomne Homologi i Røret hos Slægten Cerianthus delle Chiaje blandt Anthozoa eller de egentlige Polyper (se J. Haime's Afhandling om Cerianthus membranaceus i Ann. d. Sc. nat., 1854, Vol. 1, pag. 341 sqq, og mine Bemærkninger over samme Dyr i "Bidrag til Kundskaben om Middelhavets Littoral Fauna" i Magaz. f. Naturvid., 1856, Vol. 9, pag. 28), alene med den Forskjel, at dette Rør hos Cerianthus er dannet af lutter Nesselceller og deres Traade næsten uden nogen synlig forbindende Substants, hvorved det faar en fintraadet sammenfiltret Beskaffenhed, men hos vor Corymorpha derimod af en gelatinøs Substants med indleiede adspredte Nesselkapsler.

third part of the stem. I have never found it entirely wanting, (in any of the specimens which I have examined) as is said to be the case in C. nutans, according to Forbes and Goodsir (l. c., page 311) who have therefore also named it "tubulus caducus" — Its substance is gelatinous and appears under the microscope to be without structure, and to contain scattered thread-cells of the same sort as those afterwards described in the skin of the stem, but less numerous. On its outer surface there may nearly always be observed Polythalamia, (especially the common Planorbulina) frequently adhering to it in great numbers.

The lower rounded part of the tube, which is buried at the bottom of the sea (fig. 14—17, b) is furnished with numerous fine threads (fig. 16. m) like rootlets, by help of which it is attached to grains of sand or to algæ. These threads are flexible, but of a rather firm and horny or probably chitine-like substance. On closer examination it is observed that they properly originate or grow out from the stem itself, and indeed from the above-mentioned small round paired longitudinal rows of opaque white spots (fig. 17, k, m, Tab. 2, fig. 14, k, m). From these spots, which under the microscope appear to contain dark round granules (Tab. 2, fig. 14) (*cells?*), a number of the lower rootlets are found to extend themselves conically (*k*) projecting above the skin-surface of the stem, afterwards penetrating the tube and extending more and more outside of it (*m*) becoming thinner and more filiform, till at last they attach themselves by their extremities or grow fast to extraneous bodies (grains of sand or algæ) (*m'*). Between the stem of the animal and the surrounding tube, there is no connexion except by these filaments; and even this seems very soon to cease, as the filaments become disconnected from the stem, which may be inferred from the fact that the animal can be drawn out of its tube with the greatest ease. The numerous other round spots (higher up) appear to be vestiges of previous similar connexions.

The tube is evidently a secretion from the skin of the stem; a formation, which in its gelatinous substance has taken up the thread-cells expelled from the skin. It cannot indeed be classed with the stiff tubes of the Tubularia and of other Hydroids, which consist of chitine, and are everywhere immediately connected with the enclosed animals; but is in perfect homology with the tube of the genus Cerianthus delle Chiaje among the Anthozoa or the proper Polyps (see I. Haime's treatise on Cerianthus membranaceus in Ann. de Sc. nat., 1854, Vol. 1, page 341 &seq. and my observations on the same animal in "Bidrag til Kundskaben om Middelhavets Littoral Fauna", Magaz. f. Naturvid., 1856, Vol. 9, page 28) the only difference being that the tube in the Cerianthus is formed entirely of thread-cells and their filaments, almost without any apparent cementing substance, whereby it acquires a fine-threaded felted quality; but in our Corymorpha, on the contrary, it is of a gelatinous substance, with scattered thread-cells imbedded.

Stilkens temmelig stærke Hud er gjennemdragen af talløse, overordentlig fine, tæt sammenliggende parallele Traade, hvilke danne 2 Lag (Tab. 2, Fig. 15), idet de i det ydre (*a*) løbe efter Længden, de i det indre (*b*) paatværs, krydsende hine i en ret Vinkel. Disse Traade ere aabenbart Muskelfibre, skjøndt saadanne hidtil ikke ere fundne hos andre Hydroider. Overalt i Huden forekomme overmaade smaa kugleformige eller lidt ovale vandklare Nesselkapsler (Fig. 15, c, Fig. 16) adspredte, mest i de halvgjennemsigtige Længdestriber (Fig. 15, i), hvis hvidagtige Farve kommer af talrige meget smaa opakhvide Pigmentkorn, hvilke forekom mig at være indsluttede i langagtige, i den ene Ende spids udtrukne Celler (Fig. 17). Nesselkapslerne (Fig. 16), som i deres Indre indslutte en spiralformig sammenrullet Nesseltraad, stemme ganske overens med dem, vi senere skulle udførligere omtale i Tentaklernes Hud, hvor de ere større og findes i langt talrigere Mængde. — Stilkens Indre er solid, ikke hul, og gjennemdraget af tykke uregelmæssige Traade, hvilke synes at danne store uregelmæssige Celler fyldte med en gelatinøs Materie.

Køllen eller den egentlige Krop (Tab. 1, Fig. 14, h—o, Fig. 19) er ved en Indsnøring adskildt fra Stilken, og har et Anstrøg af Rosenrødt. Den er tykkest paa Midten og ovenfor efterhaanden smalere eller conisk. Paa den afrundede Spids findes den lille cirkelrunde Mundaabning (*o*), som dog kan udvides temmelig meget og som fører ind i den efter Køllens ydre Conturer dannede sækformige, oventil smalere, nedentil efterhaanden videre fordøiende Hule. Fra dennes Bund kunde ikke bemærkes nogen ind i Stilken sig strækkende Canal.

Køllen omgives der, hvor den er bredest, af en Krands af 40—50 i en enkelt tæt Rad staaende lange traaddannede Tentakler (Tab. 1, Fig. 14, 19, t, t), hvilke ere tykkest ved Roden og efterhaanden blive noget smalere mod deres Spids. I sit Indre vise de meget tydelige, store, temmelig uregelmæssige, i Tverretningen langstrakte Celler fyldte med en gelatinøs Materie. Deres ydre temmelig stærke Hud er ligesom Stilkens Hud muskuløs eller bestaaende af overmaade fine og tætte Længde- og Tværeller Cirkelfibre (Fig. 20, t), og indslutter talløse blæreformige Nesselkapsler, hvilke ere uregelmæssigt adspredte overalt, men dog synes at være talrigst paa Tentaklernes ydre Del imod Spidsen.

De største af disse Nesselkapsler (Fig. 20, a, a) ere ganske lidt ovale, og noget smalere i den ene Ende; de vise en dobbelt Contur og indslutte en i flere Spiralvendinger sammenrullet Nesseltraad. Denne træder ud af Kapselens spidsere Ende (*e*), og viser sig da udstrakt (Fig. 21) temmelig stiv (rigid), meget lang og overmaade tynd, dog tykkere ved Basis og efterhaanden tyndere imod den frie Ende. Ved stærk Forstørrelse (Fig. 22) bemærkes denne Traad at være i dens hele Længde besat med 2 Længderader af alternerende mørke Prikker, hvilke give den et skrueformigt Udseende eller ligesom om den var omgiven af en anden Traad i tætte Spiralvendinger,

The rather thick skin of the stem is traversed by innumerable extremely fine close-lying parallel filaments, which form 2 layers (Tab. 2, fig. 15) those of the exterior layer (*a*) running longitudinally, and those of the interior layer (*b*) transversely, at right angles with the former. These filaments are evidently muscular fibres; although such fibres have not hitherto been found in other Hydroids. Everywhere in the skin there appear extremely small globular, or rather oval, pellucid thread-cells (fig. 15, c, fig. 16) dispersed, most in the half-transparent longitudinal stripes (fig. 15, i) the whitish color of which comes from numerous very small opaque-white pigmentary granules, which appeared to be inclosed in elongated cells, drawn out to a point at one extremity (fig. 17). The thread-cells (fig. 16), which include in their interior a spirally coiled urticary filament, coincide entirely with those, which will be afterwards more particularly mentioned, in the skin of the tentacles, where they are larger, and are found in much greater numbers. The interior of the stem is solid, not hollow, and penetrated by thick irregular filaments, which seem to form large irregular cells filled with gelatinous matter.

The club, or the proper body (Tab. 1, fig. 14, h—o, fig. 19) is by a constriction separated from the stem, and has a roseate hue. It is thickest in the middle, and above gradually smaller or conical. At the rounded extremity, there is the small circular oral aperture (*o*) — susceptible however of considerable extension — leading into the digestive cavity which is shaped according to the exterior contour of the club, sack-formed, narrower above, and below gradually wider. From the bottom of this no canal communicating with the stem could be observed.

The club is encircled at its widest part by 40—50 long filiform tentacles, standing in a single close row (tab. 1, fig. 14—19 t. t.), thickest at the root, and gradually becoming more slender towards the point. In their interior, these tentacles exhibit very evident large rather irregular cells, elongated in the transverse direction and filled with a gelatinous matter. Their exterior rather strong skin is, like the skin of the stem, muscular or consists of extremely fine and close longitudinal and transverse or circular fibres (fig. 20, t) and contains innumerable vesicular thread-cells irregularly dispersed every where, while apparently most numerous in the exterior part of the tentacles towards the point.

The largest of these thread-cells (fig. 20, a. a.) are quite oval and somewhat smaller at one end; they shew a double contour, and contain an urticary filament coiled in many spiral turns. This issues from the more pointed end of the capsule (*e*) and appears when extended (fig. 21) rather stiff (rigid) very long and extremely thin, but thicker at the base, and tapering towards the free end. When strongly magnified (fig. 22) this filament exhibits in its whole length 2 longitudinal rows of alternating dark specks, which give it a screw-like appearance or the appearance of being surrounded by another filament in close spiral coils, as Gegenbauer delineates it in Rhizo-

saaledes som Gegenbauer afbilder det hos Rhizophysa filiformis (Zeitschr. f. wiss. Zool. B. 5, 1854). Overalt mellem hine store findes, og det endnu talrigere, meget mindre Nesselkapsler (*c, c*), indtil $\frac{1}{4}$—$\frac{1}{6}$ Del af hines Størrelse og af næsten kuglerund eller ganske lidt oval Form, hvilke indslutter en ligedan formet, men kun halvt saa stor Blære som den ydre og uden synlig Nesseltraad. Disse Kapsler synes at fremstille yngre Tilstande af de ovenfor beskrevne større, i hvilken Formodning jeg blev bestyrket ved Forekomsten af andre Kapsler (*b, b*), hvilke med Hensyn til Størrelsen omtrent stode midt imellem begge hine Slags og viste Spor af den fremvoxende Nesseltraad i Form af en smal Tap paa Væggen af den indre større blevne Blære.

Endelig forekomme ogsaa spredte overalt mellem de forrige endnu mindre Kapsler (*d, d*) af elliptisk Form, i hvilke, formedelst deres ringe Størrelse, ingen Nesseltraad, om en saadan findes, kunde bemærkes.

Det er ikke sjeldent hos Exemplarer af denne Hydroide, som ere satte i Spiritus, at bemærke med Lupen Tentaklerne overalt at være bedækkede med en Laadenhed af talløse overordentlig fine Smaatraade af en Længde som overgaar noget Tentaklernes halve Tværdiameter. Denne ligesom Skimmel udseende Laadenhed er ikke andet end de fra de talrige Nesselkapsler fremstrakte stive Nesseltraade.

Paa Køllens øvre coniske Del henimod Munden sidde de meget talrige (vel ikke langtfra 100) øvre Tentakler (Tab. 1, Fig. 14, 19, s) spredte uden nogen synlig Orden. De ere ligeledes traaddannede, men meget korte og tynde; de ere af samme Beskaffenhed som de nys beskrevne nedre eller lange, og have samme Slags Nesselkapsler af hvilke den største Form dog her var af meget ringere Størrelse og mindre talrig. — Begge Slags Tentakler ere gjennemsigtige med et svagt Anstrøg af Rosenrødt.

Tæt ovenfor de nedre eller lange Tentakler sidde, som sædvanligt, de gemmebærende Stilke (Fig. 14, 19, g, g), dannende en Krands eller enkelt Rad. Deres Antal er omtrent 30—35. Saaledes talte jeg hos et Exemplar af middels Størrelse 27 større og hist og her mellem og under disse 6—8 meget mindre eller fremvoxende. De udmærke sig hos nærværende Art ved deres tykkere, mere robuste cylindriske Form (Tab. 2, Fig. 1—3), ved deres intensive rosenrøde Farve, som falder i Øinene fremfor andre Dele af Dyret, samt derved, at de saagodtsom ingen Grene have, idet Gemmerne som oftest sidde enkeltvis langs opad Stilkens Sider eller undertiden flere tilsammen i Smaahobe paa en ganske kort og but Sidegren (Fig. 3). Antallet af Gemmer paa en saadan Stilk er kun ringe i Sammenligning med C. nutans; de mest udviklede (*a'*) sidde paa eller nær ved den ydre Ende af Stilken, og ere 1—$1\frac{1}{2}$ M.m. lange og omtrent halvt saa tykke, altsaa forholdsvis mindre end hos C. Sarsii, men større end hos C. nutans.

Disse Gemmers Bygning er den mærkværdigste Særegenhed ved vort Dyr og ganske afvigende fra hvad vi hidtil have seet hos de foregaaende Arter, som alle pro-

physa filiformis (Zeitschr. f. Wiss. Zool., B. 5, 1854). Everywhere among the larger thread-cells described, there are still more numerous much smaller ones (*c, c*) of $\frac{1}{4}$ or $\frac{1}{6}$ of the size of the former, and of nearly globular, or very slightly oval form, containing a vesicle of the same shape, but only half as large, as the exterior, and without any apparent urticary filament. These cells appear to represent younger states of the above-described larger ones, in which presumption I was confirmed by observing other cells (*b, b*) which in respect of size stood midway between the two sorts, and exhibited a sign of the nascent urticary filament in a smal plug on the wall of the interior more developed vesicle.

Finally there occur, dispersed everywhere among the former, still smaller thread-cells (*d, d*) of elliptical form, in which by reason of their minute size no urticary filament, even if any such existed, could be discovered. —

It is not uncommon, in specimens of this Hydroid preserved in spirit, that the tentacles can with the help of a magnifying glass be discerned to be covered everywhere with a sort of fur, of innumerable extremely fine filaments, somewhat exceeding in length half the transverse diameter of the tentacle. This fur which looks like mould, consists only of the stiff urticary filaments extended from the thread-cells.

On the upper conical part of the club, towards the mouth, there are very numerous (not far from 100) upper tentacles (Tab 1, fig. 14, 19, s) distributed without any apparent order. They are likewise filiform but very short and thin; they are of the same nature as the lower and longer tentacles previously described, and have the same sort of thread-cells, of which the largest are however very minute and less numerous. Both kinds of tentacles are transparent with a slight roseate tint.

Close above the lower or long tentacles, are situated as usual, the germ-bearing stems (fig. 14, 19, g, g) forming a circle or a single row. Their number is about 30—35. I counted in one specimen of middle size, 27 larger, and here and there among them 6—8 smaller or nascent stems. Those of the present species are distinguished by their thicker more robust cylindrical form (Tab. 2, fig. 1—3), by their more intense rosy color, which strikes the eye more than in other parts of the animal, and by their being almost without branches; as the gonozooids most frequently sit isolatedly along the sides of the stem, or sometimes several together in small clusters on a very short and truncated side-branch (fig 3). The number of gonozooids on such a stem is small in comparison with C. nutans; the most developed (*a'*) are at, or near the extremity of the stem, and are 1—$1\frac{1}{2}$ M.m. long and about half as thick; smaller therefore relatively than in C. Sarsii, but larger than in C. nutans.

The structure of these gonozooids is the most remarkable peculiarity of our animal, and quite different from what we have hitherto seen in the foregoing species,

ducere Medusegemmer, hvilke, bestemte til at løsrive sig fra Ammedyret for at føre et selvstændigt Liv, derfor udrustedes med en til saadan Levemaade svarende fuldkomnere Organisation. — De af C. glacialis opammede Medusegemmer derimod ere og blive sessile d. e. de løsne sig aldrig, men forblive i continuerlig Forbindelse med deres Ammedyr. Derfor ere de ogsaa langt simplere organiserede. De have vel den almindelige Meduseform, den klokkeformige Kappe og den ind i dennes Hule fremragende Mave (Manubrium); men Kappen er overalt tilsluttet, saaledes som den er hos hine alene paa et tidligere Udviklingstrin, uden Tentakler (Randtraade), det hele Karsystem fattes ganske, og endelig mangle de al eiendommelig Bevægelse.

De ere altsaa yderst ufuldkomment organiserede Meduser, og ligne saaledes ganske de hos mange Coryneer, Tubularier og Sertularier forekommende saakaldte "Generationskapsler", hvilke længe af Zoologerne holdtes for Organer og navnlig Kjønsorganer, men nu almindelig anerkjendes som Kjønsdyr, ufuldkomne Meduser eller den anden Generation af alle disse Generationsvexelens Lov underkastede Dyr.

Vi gaa nu over til den nærmere Beskrivelse af disse Medusegemmer hos vort Dyr.

De ere af tvende Slags, mandlige og kvindelige. Vor Corymorpha, det isoleret levende Ammedyr, producerer altid kun Medusegemmer af det ene Kjøn. Det samme, vide vi, finder ogsaa Sted hos alle til Colonier forenede Hydroider, hvor Kjønnene altid ere fordelte paa forskjellige Colonier.

Begge Slags Gemmer ligne hinanden meget; dog ere de mandlige (Tab. 2, Fig. 9—13) i udviklet Tilstand sædvanlig mere langstrakte eller elliptiske (Fig. 12, 13), de kvindelige (Fig. 5—7) derimod noget kortere og mere bugede eller ovale. I meget ung Tilstand (Fig. 4, a′, Fig. 10) ere Kjønnene ikke til at adskille. Disse fremspirende unge Gemmer ere nemlig ovale, den gjennemsigtige svagt rødlige Kappe ligger tæt til den store elliptiske opakrødlige Mave (*b*), og Stilken (*s*), med hvilken de ere fæstede, er tykkere end den senere bliver; endelig er Kappens ydre Ende altid simpelt tilrundet. — Hos de udviklede Gemmer, hvis Kjøn let kan erkjendes af deres Indhold, bemærker man paa den ydre Ende af Kappen 4 meget smaa, undertiden, og som det synes hos de mandlige Gemmer (Fig. 12, 13), mindre tydelige, rundagtige eller coniske lave Knuder, mellem hvilke der, naar Gemmerne ere komne til fuld Modenhed, dannes en Aabning (Fig. 5, 6, q) for Udtømmelsen af Kjønsstofferne.

Mellem den gjennemsigtige dobbelt conturerede Kappe (af Allman kaldet Ectoderm), som har udviklet sig betydeligt (Fig. 5—7, p), og den ved Kappens Vext tilsyneladende mindre blevne, nu mere cylindriske opakrødlige Mave (*b*) (Endoderm Allman), er der nu et stort Hulrum, (som svarer til Svømmehulen hos de frie Meduser), og i dette er det at Kjønstofferne dannes, i de kvindelige

which all produce gonozooids destined to disconnect themselves from the parent animal and to lead an independent life, and therefore furnished with a perfect organisation corresponding to such a mode of life. The gonozooids reared by the C. glacialis are, and remain sessile, i. e. they never loosen themselves, but continue in connexion with their parent animal. Therefore they are much more simply organised. They have indeed the usual medusa form, the bell-shaped umbrella, and the prominent stomach (manubrium) enclosed in its cavity; but the umbrella is everywhere closed — as in an earlier stage only of the species previously described. They are without tentacles (marginal filaments) entirely without any vascular system, and finally they are without any peculiar movement.

They are therefore very imperfectly organised medusæ, and resemble entirely the so-called "generative capsules" occurring in many of the Corynidæ Tubulariidæ and Sertulariidæ, which were for a long time considered by the zoologists as organs, and particularly sexual organs, but are now generally recognised as sexual animals, imperfect medusæ or the secondary generation, all these animals being subject to the law of alternate generation.

We now proceed to describe more minutely these gonozooids in our animal.

They are of two sorts, male and female. Our Corymorpha, the isolated living parent, produces always gonozooids of one sex only. We know that the same takes place also in all Hydroids united in colonies, where the sexes are always distributed in different colonies..

Both sorts of gonozooids resemble each other very much; but the males (Tab. 2, fig. 12—13) are, when fully developed, usually more elongated or elliptical (fig. 12—13); the females (fig. 5—7) are somewhat shorter and more swollen or oval. In a very young state (fig. 4, a′, fig. 10) the sexes can not be distinguished. These nascent young buds are oval; the transparent light reddish umbrella lies close round the large elliptical opaque-reddish manubrium (*b*); and the stem (*s*) by which they are attached is thicker than it afterwards becomes; and lastly the outer end of the umbrella is always simply rounded. In the developed gonozooids, the sex of which is easily known by their contents, there may be observed at the outer end of the umbrella 4 very small tubercles, which are sometimes, mostly in the males (fig. 12—13) not very distinct. These tubercles are roundish or low-conical; and between them, when the gonozooids arrive at maturity, an opening is formed (fig. 5, 6, q) for the discharge of the sexual matter.

Between the transparent doubly-contoured umbrella (called by Allman the Ectoderm) which is considerably developed (fig. 5—7, p.) and the opaque reddish manubrium (*b*) (Endoderm Allman) which becomes apparently smaller and more cylindrical during the growth of the umbrella, there is in the mature gonozooids a large cavity (answering to the swimming cavity in the free medusæ);

Gemmer Æg og Embryoner, i de mandlige Spermatozoider. Hos de iagttagne kvindelige Gemmer (Fig. 5—7) vare Æggene allerede udviklede til Embryoner af en kort oval lidt fladtrykt Form (Planula Dalyell) og opak bleg rosenrød Farve (Fig. 8). Efter den forskjellige Størrelse og Udvikling af disse Gemmer fandtes i hver af dem fra 1 indtil 10 Embryoner (Fig. 5—7), hvilke hyppig ved deres tiltagende Vext skyde Maven til den ene Side af Kappens indre Væg (Fig. 5, 6).

De mandlige Gemmer ere i udviklet Tilstand opakgulhvide af Sperma, som udfylder Hulrummet mellem Kappen og Maven (Fig. 10, 11 yngre, Fig. 12, 13 ældre mandlige Gemmer, hvor Maven skjules af den opake Sperma). Spermatozoiderne, som have en zittrende Bevægelse, ere rundagtig — ovale med lang haarformig Hale. —

Ingensomhelst selvstændig Bevægelse bemærkedes iøvrigt hos nogen af de beskrevne Medusegemmer.

De ovenbeskrevne 4 til Slægten Corymorpha hørende Arter kunne diagnoseres saaledes:

a. *Corymorpha nutans,* Sars.

Proles hydriformis 3—4 pollicaris, tentaculis inferioribus filiformibus longissimis uniserialibus 40—50, superioribus brevissimis numerosissimis sparsis; pedunculis gemmigeris circiter 15—20, tenuibus, longiusculis, ramosis, ramulis alternantibus apice gemmis medusinis numerosis minimis dense accumulatis obsitis.

Proles medusiformis decidua, pallio campanulato apice conico, canales qvatuor radiantes exhibente, antice aperto margine obliqve truncato ibiqve bulbis qvatuor marginalibus æqvidistantibus ornato, qvorum unus solummodo in cirrum cylindricum porrectum evolvitur.

b. *Corymorpha Sarsii,* Steenstrup.

Proles hydriformis 2—3½ policaris, tentaculis inferioribus filiformibus longissimis uniserialibus 30—40, superioribus numerosissimis brevissimis sparsis; pedunculis gemmigeris 8—24, tenuissimis, breviusculis, apice divisis, gemmis medusinis paucis maximis obsitis.

Proles medusiformis decidua, pallio elongato-campanulato apice rotundato, canales qvatuor radiantes exhibente, antice aperto, margine recto ibiqve bulbis seu cirris marginalibus enascentibus qvatuor æqvidistantibus, omnibus æqvalibus, ornato.

c. *Corymorpha annulicornis,* Sars.

Proles hydriformis ⅔ pollicaris, tentaculis inferioribus filiformibus longioribus annulosis 20, superioribus 8—10 uniserialibus brevissimis apice globoso; pedunculis gemmigeris brevissimis, gemmis medusinis majoribus et paucioribus obsitis.

and in this cavity the sexual matter is formed: in the female gonozooids, ova and embryos; in the males, spermatozooids. In the female gonozooids observed (fig. 5—7) the eggs were already developed to embryos of a short-oval slightly flattened form (Planula Dalyell) and opaque pale roseate color (fig. 8). According to the different size and development of these gonozooids, there were found in each of them from 1—10 embryos (fig. 5—7) which frequently by their increasing growth push the manubrium against one side of the interior wall of the umbrella (fig. 5, 6).

The male gonozooids are in the developed state opaque-yellowish white from the sperm which fills the cavity between the umbrella and the manubrium (fig. 10, 11 younger, fig. 12, 13 older male gonozooids, in which the manubrium is hidden by the opaque sperm). The spermatozooids, which have a vibratory movement, are roundish-oval with a long hair-like tail.

No independent movement whatever could be observed in any of the gonozooids of this species here described.

The above-described 4 species belonging to the genus Corymorpha are diagnosticated as follows:

a. *Corymorpha nutans,* Sars.

Proles hydriformis 3—4 pollicaris, tentaculis inferioribus filiformibus longissimis uniserialibus 40—50 superioribus brevissimis numerosissimis sparsis; pedunculis gemmigeris circiter 15—20, tenuibus, longiusculis, ramosis, ramulis alternantibus apice gemmis medusinis numerosis minimis dense accumulatis obsitis.

Proles medusiformis decidua, pallio campanulato apice conico, canales quatuor radiantes exhibente, antice aperto, margine oblique truncato ibique bulbis quatuor marginalibus æquidistantibus ornato, quorum unus solummodo in cirrum cylindricum porrectum evolvitur.

b. *Corymorpha Sarsii,* Steenstrup.

Proles hydriformis 2—3½ pollicaris, tentaculis inferioribus filiformibus longissimis uniserialibus 30—40 superioribus numerosissimis brevissimis sparsis; pedunculis gemmigeris 8—24 tenuissimis, breviusculis, apice divisis, gemmis medusinis paucis maximis obsitis.

Proles medusiformis decidua, pallio elongato-campanulato apice rotundato, canales quatuor radiantes exhibente, antice aperto, margine recto ibique bulbis seu cirris marginalibus enascentibus quatuor æquidistantibus omnibus æqualibus ornato.

c. *Corymorpha annulicornis,* Sars.

Proles hydriformis ⅔ pollicaris, tentaculis inferioribus filiformibus longioribus annulosis 20, superioribus 8—10 uniserialibus brevissimis apice globoso; pedunculis gemmigeris brevissimis gemmis medusinis majoribus et paucioribus obsitis.

Proles medusiformis decidua, pallio breviter campanulato, canales qvatuor radiantes exhibente, antice aperto, margine bulbo seu cirro marginali unico magno, conico-elongato vel cylindrico, introrsum flexo, ceterisqve tribus indistinctis, ornato.

d. *Corymorpha glacialis,* Sars.

Proles hydriformis 4—5 pollicaris, tentaculis inferioribus filiformibus longissimis uniserialibus 40—50, superioribus numerosissimis brevissimis sparsis; pedunculis gemmigeris 30—35, brevioribus, crassis, indivisis aut solummods ramulis nonnullis brevissimis, gemmis medusinis paucis minoribus sparsis, singulis aut pluribus accumulatis, obsitis.

Proles medusiformis sessilis (nunqvam decidua), pallio ovali absqve canalibus radiantibus et bulbis (cirris) marginalibus, undiqve clauso, in aliis animalibus altricibus ova, in aliis spermatozoa inculdens.

FORKLARING AF FIGURERNE.

Tab. 1, Fig. 7 forestiller *Corymorpha annulicornis* i naturlig Størrelse fra Siden.

Fig. 8. Den samme, omtrent 6 Gange forstørret. *a* Stilken tilligemed sit Rør; *b* de smaa Rodtrevler, hvormed Røret er fæstet til fremmede Gjenstande; *c, c* Køllen; *d* Enden af samme, hvor Mundaabningen er beliggende; *e, e* de øverste eller orale Tentakler; *f, f* de nederste eller aborale Tentakler; *g, g* Medusegemmerne; *h* de korte Papiller omkring Køllens nederste Del eller Hals.

Fig. 9. En af de orale Tentakler, stærkt forstørret. *e* Endeknoppen.

Fig. 10. Et Stykke af en af de aborale Tentakler, *a, a* de ringformigt ordnede Nesselorganer.

Fig. 11—12. To udviklede Medusegemmer seede fra Siden. *b* Manubrium; *c, c* Radiærcanalerne; *d, d* de mørke Randpletter; *f* den udviklede indadkrummede Randtentakel; *p* Umbrella eller Kappen; *s* Stilken, hvorved Gemmen er fæstet.

Fig. 13. En mindre udviklet Medusegemme. Bogstaverne som paa de to foregaaende Figurer.

Fig. 14. *Corymorpha glacialis* i naturlig Størrelse fra Siden. *a, a* Stilken med dens Rør; *b* Rørets nederste opsvulmede Ende med Rodtrevlerne; *d* Stilkens hvide Længdestriber, *d' d'* viser et Sted, hvor disse Længdestriber dele sig og anastomosere med hinanden; *g, g* Gemmerne; *h* Køllens nederste Del eller Hals; *o* dens forreste eller øverste Ende (Proboscis) med Mundaabningen; *s, s* de orale Tentakler; *t, t* de aborale Tentakler.

Fig. 15. Stilken af et yngre Exemplar noget trukket ud af sit Rør. *a, a* Stilken; *a—e* dennes bageste eller nederste conisk tilløbende Ende; *b* Rørets nederste opsvulmede Ende; *c, c* dets øvre, her Stilken løst omhyllende Del; *d'* et Sted, hvor en af Stilkens hvide Længdestriber deler sig opad gaffelformigt.

Fig. 16. Den nederste Del af samme forstørret. *m* de talrige fra Rørets nederste opsvulmede Del udgaaende Rodtrevler; de øvrige Bogstaver som paa Fig. 14 og 15.

Fig. 17. Den nederste Del af et andet Exemplar, hos hvilket Stilken ikke er hævet op fra Rørets Bund. *b* den nederste opsvulmede Ende af Røret; *k, k* fra Stilken fremspirende

Proles medusiformis decidua, pallio breviter campanulato canales quatuor radiantes exhibente, antice aperto, margine bulbo seu cirro marginali unico magno, conico-elongato vel cylindrico, introrsum flexo ceterisque tribus indistinctis ornato.

d. *Corymorpha glacialis,* Sars.

Proles hydriformis 4—5 pollicaris, tentaculis inferioribus filiformibus longissimis uniserialibus 40—50 superioribus numerosissimis brevissimis sparsis; pedunculis gemmigeris 30—36 brevioribus crassis indivisis aut solummodo ramulis nonnullis brevissimis, gemmis medusinis paucis minoribus sparsis singulis aut pluribus accumulatis, obsitis.

Proles medusiformis sessilis (nunquam decidua) pallio ovali, absque canalibus radiantibus et bulbis (cirris) marginalibus, undique clauso in aliis animalibus altricibus ova, in aliis spermatozoa includens.

EXPLANATION OF THE FIGURES.

Tab. 1, fig. 7 represents *Corymorpha annulicornis* of natural size, seen from the side.

Fig. 8. The same magnified about 6 times: *a,* the stem together with its tube; *b,* the small rootlets by which the stem is attached to extraneous substances; *c c,* the club; *d,* the extremity where the oral aperture is situated; *e e,* the upper or oral tentacles; *f f,* the lower or aboral tentacles; *g g,* the gonozooids; *h,* the short papillæ around the lower part or neck of the club.

Fig. 9. One of the oral tentacles strongly magnified: *e,* the terminal knob.

Fig. 10. A part of one of the aboral tentacles: *a a,* the annularly arranged thread-cells.

Fig. 11, 12. Two developed gonozooids seen from the side: *b,* the manubrium; *c c,* the radial canals; *d d,* the dark marginal spots; *f,* the developed marginal tentacle curved inwards; *p,* the umbrella or mantle; *s,* the stem by which the germ is attached.

Fig. 13. A less developed gonozooid. The letters as in the two preceding figures.

Fig. 14. *Corymorpha glacialis* natural size, side view: *a a,* the stem with its tube; *b,* the lower enlarged extremity of the tube, with the rootlets; *d,* the white longitudinal stripes on the stem; *d d* shews a place where these longitudinal stripes divide themselves or anastomose with each other; *g g,* the gonozooids; *h,* the lowest part or neck of the club; *o,* its anterior or superior extremity (proboscis) with the oral aperture; *s s,* the oral tentacles; *t t,* the aboral tentacles.

Fig. 15. The stem of a younger specimen, drawn a little out of its tube. *a a,* the stem; *a—e,* its posterior or inferior conically terminated extremity; *b,* the lower enlarged extremity of the tube; *c c,* its upper part, in this place loosely surrounding the stem; *d',* a place where one of the white longitudinal stripes on the stem divides itself or becomes forked in its course upwards.

Fig. 16. The lower part of the same magnified: *m,* the numerous rootlets issuing from the lower enlarged part of the tube; the other letters as in figures 14 and 15.

Fig. 17. The lower part of another specimen, in which the stem is not lifted from the bottom of the tube: *b,* the lower enlarged end of the tube; *k k,* rootlets issuing from the

Rodtrevler; *m, m* saadanne, som allerede have gjennembrudt Rørets Væg og herved fæstet Stilken til Røret.

Fig. 18. Et Stykke af Stilkens nedre Parti umiddelbart ovenfor den coniske Endedel stærkt forstørret. *d, d, d* de hvide Længdestriber; *f, f* de opake hvide med Længdestriberne ved en smal Streng forbundne Punkter, hvorfra Rodtrevlerne spire frem.

Fig. 19. Køllen lidt forstørret seet forfra. *g, g, g* Gemmestilkene; *o* Mundaabningen; *s* de orale Tentakler; *t, t* de aborale Tentakler.

Fig. 20. Et Stykke af en af de aborale Tentakler comprimeret og omtrent 490 Gange forstørret. *a, a* fuldt udviklede Nesselkapsler med tydelig spiralformig oprullet Nesseltraad; *b, b* noget mindre Nesselkapsler, hvori Nesseltraaden først er anlagt; *c, c* endnu mindre Nesselkapsler, der kun vise en indre efter de ydre Conturer dannet klar Blære; *d, d* uudviklede elliptiske Nesselkapsler uden indre Blære; *e, e* Nesselkapsler, hvoraf Nesseltraaden er udtraadt; *t* den ydre fibrøse Hud af Tentakelen.

Fig. 21. En Nesselkapsel med udstrakt Nesseltraad isoleret.

Fig. 22. Samme omtrent 700 Gange forstørret, visende de mørke alternerende Punkter langs Nesseltraaden.

Tab. 2, Fig. 1. En Gemmestilk med paasiddende Gemmer omtrent 3 Gange forstørret.

Fig. 2. En anden noget uregelmæssigt bøiet Gemmestilk.

Fig. 3. En tredie Gemmestilk, der paa den ene Side viser 2 korte ufuldstændige Sidegrene. For alle 3 Figurer betegner *a, a* smaa fremspirende Gemmer; *a' a'* større med Generationsstoffe fyldte Gemmer; *s* den fælles Stilk.

Fig. 4. Et Stykke af en Gemmestilk 25 Gange forstørret. *a* en særdeles liden fremspirende Gemme; *a' a'* større men endnu langtfra fuldt udviklede Gemmer; *b* Manubrium; *s* Hovedstammen; *s, s* Gemmernes Stilke.

Fig. 5—7. Fuldt udviklede kvindelige Gemmer 15 Gange forstørrede, den ene (Fig. 5) med kun 1, den anden (Fig. 6) med 3 og den tredie (Fig. 7) med 7—8 Æg eller Embryoner. *b* Manubrium; *c* Æg eller Embryoner; *p* Kappen (Umbrella); *q* den ydre Aabning af samme; *s* Stilken.

Fig. 8. Et Embryo (Planula) fra den brede og smale Side.

Fig. 9—13. Mandlige Gemmer, de 3 første uudviklede, de 2 sidste fuldt udviklede, fyldte med Sperma.

Fig. 14. Et Stykke af Stilkens bagre Parti omtrent 25 Gange forstørret. *k, k* fremspirende Rodtrevler; *m, m* udviklede Rodtrevler, der have gjennembrudt Rørets Væg; *m' m'* saadanne, som allerede have fæstet sig til Sandpartikler.

Fig. 15. Et Stykke af Stilkens ydre Hud, 170 Gange forstørret. *a, a* longitudinale Muskelfibre; *b, b* transversale Muskelfibre; *c, c* Nesselkapsler; *i, i* de hvide Længdestriber.

Fig. 16. Uudviklede Nesselkapsler af Stilkens Hud, 490 Gange forstørrede.

Fig. 17. Paatværs udtrukne Celler fra de hvide Længdestriber med indsluttede Pigmentkorn, 490 Gange forstørrede.

Fig. 18. Køllen af *Corymorpha Sarsii* lidt forstørret, seet forfra. *a, a* Medusegemmer; *b* Køllens forreste coniske Del (Proboscis); *c, c* de aborale Tentakler; *d* Mundaabningen; *e* de orale Tentakler.

Fig. 19, 20. To Gemmestilke, omtrent 6 Gange forstørrede. *a, a* smaa fremspirende Medusegemmer; *a' a'* noget videre-komne Medusegemmer, paa hvilke de 4 Randknuder allerede ere anlagte; *a" a"* betydelig større Medusegemmer, paa hvilke dog endnu Manubrium er lidet udviklet; *a''' a'''* de største med stærkt udviklet Manubrium forsynede Medusegemmer; *s* den fælles Stamme.

stem; *m m,* rootlets which have already pierced through the wall of the tube, and thereby fixed the stem to the tube.

Fig. 18. A piece of the lower part of the stem immediately above the conical termination, strongly magnified: *d d d,* the white longitudinal stripes; *f f,* the opaque white points connected with the longitudinal stripes by a fine cord, and from which points the rootlets issue.

Fig. 19. The club slightly magnified, front view: *g g g,* the germ-stems; *o,* the oral aperture; *s,* the oral tentacles; *t t,* the aboral tentacles.

Fig. 20. A piece of one of the aboral tentacles compressed and magnified about 490 times: *a a,* fully developed thread-cells, with spirally coiled urticary filaments distinctly apparent; *b b,* somewhat less developed thread-cells, in which the urticary filament is only in a rudimentary state; *c c,* still smaller thread-cells, shewing only an interior clear vesicle formed according to the exterior contour; *d d,* undeveloped elliptical thread-cells without any interior vesicle; *e e,* thread-cells from which the urticary filament is extended; *t,* the exterior fibrous skin of the tentacle.

Fig. 21. A thread-cell with extended urticary filament isolated.

Fig. 22. The same about 700 times magnified, shewing the dark alternating points along the urticary filament.

Tab. 2, fig. 1. A germ-stem with gonozooids attached, magnified about 3 times.

Fig. 2. Another somewhat irregularly bent reproductive stalk.

Fig. 3. A third germ-stem, which on one side exhibits 2 short incomplete lateral branches. In all 3 figures *a a* denotes small enascent buds; *a' a'* larger gonozooids filled with generative matter; *s,* the common stem.

Fig. 4. A piece of a germ-stem magnified 25 times: *a,* a particularly small enascent bud; *a' a',* larger buds, but still far from being fully developed; *b,* the manubrium; *s,* the main stem; *s' s',* the stalks of the buds.

Fig. 5—7. Fully developed female gonozooids magnified 15 times, one of them (fig. 5) with only 1, the second (fig. 6) with 3, and the third (fig. 7) with 7—8 eggs or embryos: *b,* the manubrium; *c,* eggs or embryos; *p,* the mantle (umbrella); *q,* the exterior aperture of the same; *s,* the stem.

Fig. 8. An embryo (planula) seen from the broad and narrow sides.

Fig. 9—13. Male gonozooids: the first 3 undeveloped; the last 2 fully developed and filled with sperm.

Fig. 14. A piece of the posterior part of the stem, about 25 times magnified: *k k,* nascent rootlets; *m m,* developed rootlets which have penetrated the walls of the tube; *m' m',* those which have already attached themselves to particles of sand.

Fig. 15. A piece of the exterior skin of the stem magnified 170 times: *a a,* longitudinal muscular fibres; *b b,* transverse muscular fibres; *c c,* thread-cells; *i i,* the white longitudinal stripes.

Fig. 16. Undeveloped thread-cells from the skin of the stem, magnified 490 times.

Fig. 17. Cells from the white longitudinal stripes, drawn out transversely and containing pigmentary granules, magnified 490 times.

Fig. 18. The club of *Corymorpha Sarsii* slightly magnified, front view: *a a,* gonozooids; *b,* the anterior conical part (proboscis) of the club; *c c,* the aboral tentacles; *d,* the oral aperture; *e,* the oral tentacles.

Fig. 19, 20. Two germ stems, magnified about 6 times: *a a,* small nascent gonozooids; *a' a',* somewhat more advanced gonozooids, in which the rudiments of the 4 marginal tubercles already appear; *a" a",* considerably larger gonozooids, in which however the manubrium is but slightly developed; *a''' a''',* the largest gonozooids furnished with a strongly developed manubrium; *s,* the common stem.

Fig. 21. En af de korte terminale Grene med 4 paasiddende Gemmer, 15 Gange forstørret. *a* smaa fremspirende Medusegemmer; *a'* en noget større med Anlæg til Randknopperne forsynet Medusegemme; *a"* en betydelig større, men endnu ikke fuldt udviklet Medusegemme; *b* Manubrium; *c, c* Radiærkarrene; *d, d* Randknuderne (de fremspirende Randtentakler); *p* Umbrella; *s* den fælles Gren.

Fig. 22. En Medusegemme lignende den største paa foregaaende Figur isoleret. Bogstaverne som paa Fig. 21 *a"*.

Fig. 23. En af de største Medusegemmer med stærkt udviklet udenfor Umbrella rækkende Manubrium. *g* Ringkarret; *h* den knopformige Ende af Manubrium; de øvrige Bogstaver som paa Fig. 22.

Fig. 24. En anden ligeledes af de største Medusegemmer, paa hvilken Umbrella har trukket sig stærkt sammen i longitudinal Retning. Bogstaverne som paa Fig. 23.

Tab. 6, Fig. 9. En stærkt udviklet Gemmestamme med en accessorisk Sidegren paa Midten, omtrent 4 Gange forstørret.

Fig. 10—12. Kvindelige Medusegemmer med sig i Manubriums Vægge udviklende Æg, omtrent 20 Gange forstørrede. *b* Manubrium; *b'* den indre Hule af samme; *c, c* Radiærkarrene; *d, d* Randknopperne; *d'* (Fig. 12) en sig fra den ene Randknop udviklende Randtraad eller Tentakel; *g* Ringkarret; *h* Mundaabningen; *i* Diaphragma (Velum); *o* sig udviklende Æg; *p* Umbrella; *s* Stilken.

Fig. 13—16. De første amoebeagtigt forgrenede Stadier af Æggets Udvikling.

Fig. 17—18. De forgrenede Fortsatser have lidt efter lidt draget sig ind og Ægget antaget en rundagtig Form.

Fig. 19. Et Æg, der allerede har antaget Kugleform og hvori den indre Kjærne ikke længere er synlig; nedentil sees den tynde Stilk, hvormed det er fæstet til Manubrium.

Fig. 20. Et efter al Sandsynlighed modent Æg, der er færdigt til at udstødes af Umbrella.

Fig. 21 og 23. Mandlige Gemmer med mere eller mindre stærkt forlænget Manubrium. Bogstaverne som paa Fig. 10—12.

Fig. 22. Spermatozoider udtagne af Manubriums Vægge, omtrent 600 Gange forstørrede.

Tab. 2, Fig. 25. En Gemmestamme af *Corymorpha nutans* i naturlig Størrelse.

Fig. 26. Samme omtrent 8 Gange forstørret. *a* Stammen; *b* Sidegrenene; *c* de paa Enden af disse klasevis ordnede Medusegemmer.

Fig. 27. En enkelt Medusegemme omtrent 60 Gange forstørret. *b* Manubrium; *c, c* Radiærkarrene; *d, d* de 3 mindre Randknopper; *e* den større Randknop med den sig udviklende Tentakel eller Randtraad; *f* den knopformige Ende af denne Tentakel; *g* Ringkarret; *s* Stilken.

Fig. 28. En Medusegemme af et andet Individ tilligemed 3 smaa fremspirende Gemmer ved dens Basis. *a* en meget liden knopformig Gemme; *a' a'* noget større Gemmer, paa hvilke allerede den fremtrædende Randtentakel har begyndt at danne sig; *a"* en fuldt udviklet Medusegemme; de øvrige Bogstaver som paa Fig. 27.

Fig. 21. One of the short terminal branches, with 4 gonozooids attached, 15 times magnified: *a*, small nascent gonozooids; *a'*, a somewhat larger gonozooid, with rudiments of the marginal tubercles; *a"*, one considerably larger, but not yet fully developed; *b*, the manubrium; *c c*, the radial vessels; *d d*, the marginal tubercles (nascent marginal tentacles); *p*, the umbrella; *s*, the common branch.

Fig. 22. A gonozooid similar to the largest in the preceding figure isolated. The letters as in fig. 21, a".

Fig. 23. One of the largest gonozooids with strongly developed manubrium extending beyond the umbrella: *g*, the circular vessel; *h*, the knob-like extremity of the manubrium; the other letters as in figure 22.

Fig. 24. Another of the largest gonozooids, in which the umbrella has contracted itself strongly in a longitudinal direction. The letters as in figure 23.

Tab. 6, fig. 9. A strongly developed reproductive stalk, with an accessory lateral branch in the middle, magnified about 4 times.

Fig. 10—12. Female gonozooids, with the ova developing themselves in the walls of the manubrium, magnified about 20 times. *b*, the manubrium; *b'*, its interior cavity; *c c*, the radial vessels; *d d*, the marginal tubercles; *d'*, (fig. 12) a marginal filament or tentacle developing itself from one of the marginal tubercles; *g*, the circular vessel; *h*, the oral aperture, *i*, the diaphragm (velum); *o*, ova developing themselves; *p*, the umbrella; *s*, the stem.

Fig. 13—16. The earliest Amoeba-like ramified stages of the development of the egg.

Fig. 17—18. The ramified processes have gradually become retracted; and the egg has assumed a roundish form.

Fig. 19. An egg which has already become globular, and in which the interior nucleus is no longer visible; in the lower part of the egg there appears the thin stem by which it is attached to the manubrium.

Fig. 20. An egg which is in all probability mature, and ready to be expelled from the umbrella.

Fig. 21 and 23. Male gonozooids with more or less elongated manubrium. The letters as in fig. 10—12.

Fig. 22. Spermatozoids taken out of the walls of the manubrium, magnified about 600 times.

Tab. 2, fig. 25. A germ-stem of *Corymorpha nutans*, natural size.

Fig. 26. The same magnified about 8 times. *a*, the stem; *b*, the lateral branches; *c*, the gonozooids in clusters at the extremities of the lateral branches.

Fig. 27. A single gonozooid magnified about 60 times: *b*, the manubrium; *c c*, the radial vessels; *d d*, the 3 smaller marginal tubercles; *e*, the larger marginal tubercle, with the tentacle or marginal filament developing itself; *f*, the knob-like extremity of this tentacle; *g*, the circular vessel; *s*, the stem.

Fig. 28. A gonozooid of an other specimen, together with 3 small enascent buds at its base: *a*, a very small bud-like gonozooid; *a' a'*, somewhat larger gonozooids, on which the prominent marginal tentacle has already begun to form itself; *a"*, a fully developed gonozooid; the other letters as in figure 27.

II. BESKRIVELSE OVER *STEENSTRUPIA GLOBOSA*.

EN NY ART AF DE LAVERE MEDUSER.

(Tab. 1, Fig. 1—6.)

Steenstrupia globosa, Sars, Christiania Vid. Selsk. Forh., 1859, pag. 101.

Med dette Navn har jeg paa ovenanførte Sted kortelig characteriseret en liden fritsvømmende Meduse, som viser saa megen Lighed med nogle af de af Corymorpha opammede Medusegemmer, at det forekommer mig sandsynligt, at den stammer fra en Art af denne Ammeslægt.

At den maa henføres til den af Forbes (Monograph of the British naked-eyed Medusæ pag. 72) opstillede Slægt Steenstrupia, kan vel neppe være tvivlsomt, uagtet den ikke ganske svarer til de af Forbes givne Slægtscharacterer. Skiven eller Kappen er nemlig ikke "conisk tilspidset", men rund hvælvet; der er ingen "forbindende Streng (chord) fra Apex til Subumbrella", og endelig findes ikke blot "én enkelt", men 3 Randtraade udviklede fra den ene af de 4 Randbulber. Disse Forskjelligheder kunne dog neppe betragtes anderledes end som specifiske; ja Tilstedeværelsen af en "Streng indeni Apex" synes saameget mindre at burde bibeholdes som Slægtscharacter som den neppe engang er constant for Arten, idet denne Streng vel ikke er noget andet end en Levning af Ernæringskarret, som i den forrige fastsiddende Tilstand forbandt Medusegemmen med dens Ammedyr. Formodentlig have de to af Forbes beskrevne Arter, S. rubra og S. flaveola, som vise denne Streng, først nylig været afløste fra deres Ammedyr; hos vor norske Art fandtes ikke Spor af den.

Steenstrupia globosa er $2\frac{1}{2}$ M.m. lang og 3 M.m. bred, dens Randtraade i fuldt udstrakt Tilstand mere end 20 M.m. lange. Den adskiller sig (Fig. 2, 3) ved første Øiekast fra hine 2 brittiske Arter ved dens bugede, kortklokkeformige, næsten kugledannede Kappe (Umbrella Forbes), hvis forreste ganske lidt firkantede Rand er skjævt afskaaren, idet den rager noget længere frem eller er noget høiere i det Hjørne, hvor Randtraadene sidde. Denne Kappe (*a*) er aldeles farveløs eller vandklar, glat og jævntyk, idet dens indre hule Flade (Subumbrella Forbes (*b*) har samme Form som dens ydre Contur; dens bageste Ende, Toppen (Apex) eller Kuppelen er jevnt tilrundet, ikke conisk eller tilspidset som hos hine brittiske Arter, men i denne Henseende overensstemmende med den af Steenstrup (Ueber den Generationswechsel pag. 22, Tab. 1, Fig. 43—45) iagttagne, af Coryne fritillaria Stp., opammede Meduse, hvis nære Beslægtskab med hine ogsaa Forbes selv har erkjendt (l. c., pag. 72).

Fra Bunden af Kappehulen (Svømmehulen) hænger, ligesom Kolben i en Klokke, den cylindriske eller tenformige Mave (Fig. 2, 3, c, Fig. 4) frit ned. Denne Mave, som forresten antager forskjellige Former efter dens forskjellige Contractionsgrad og ofte stærkt forkortes, hvorved den bliver saameget tykkere, er blodrød, har tykke Vægge, en efter dens ydre Contourer dannet indre Hule,

II. DESCRIPTION OF *STEENSTRUPIA GLOBOSA*.

A NEW SPECIES OF THE LOWER MEDUSÆ.

(Tab. 1, fig. 1--6).

Steenstrupia globosa, Sars, Christiania Vid. Selsk. Forh., 1859, page 101.

I have in the above mentioned work, thus named and shortly characterised a small freely-swimming Medusa, which so much resembles some of the gonozooids fostered by the Corymorpha, that I consider it as very probably the offspring of some species of this genus.

That it may be referred to the genus Steenstrupia established by Forbes (Monograph of the British naked-eyed Medusæ, page 72) can scarcely be doubted; although it does not exactly answer to the generic characteristics given by Forbes. The disc or umbrella is not "conically pointed" but rounded; there is no "connecting chord from the apex to the subumbrella"; and finally not only "a single" but 3 marginal filaments are developed from one of the 4 marginal bulbs. These differences can however scarcely be regarded as more than specific; nay the presence of a "chord within the apex" does not appear retainable as a characteristic of genus; seeing that it is not even constant in the species; this chord being probably nothing but a remnant of the alimentary vessel, which connected the gonozooid, in its previous attached state, with the parent animal. Probably the two species described by Forbes, S. rubra and S. flaveola, which exhibit this chord, had been recently disconnected from their parent: in our Norwegian species, there was no trace of any such chord.

Steenstrupia globosa is $2\frac{1}{2}$ M.m. long, and 3 M.m. wide; its marginal filaments fully extended are more than 20 M.m. long. It is distinguished (fig. 2, 3) at first glance from the 2 British species, by its swollen short-bell-shaped nearly globular umbrella, the anterior slightly squared margin of which is obliquely truncated, projecting somewhat more, or being a little higher at the corner, where the marginal filaments are situated. This umbrella (*a*) is quite colorless or pellucid, smooth and of even thickness; its interior hollow surface (subumbrella Forbes) (*b*) having the form of its outline; its posterior extremity, (apex) or cupola is evenly rounded, not conical or pointed as in the British species referred to, answering in that respect to Steenstrup's description (über den Generationswechsel, page 22, tab. 1, fig. 43—45) of the Medusa fostered by the Coryne fritillaria Stp., of which also Forbes himself has recognised the close relationship to the British species (l, c, page 72).

From the bottom of the cavity of the umbrella (the swimming cavity) there hangs, like the clapper of a bell, the cylindrical or fusiform stomach (fig. 2, 3, c, fig. 4). This stomach, — which moreover assumes various forms according to its different degrees of contraction, and is often considerably shortened, whereby it becomes so much thicker — is blood-red; it has thick walls, with an

og rækker i udstrakt Tilstand med dens forreste frie Ende, paa hvilken den simpelt runde Mundaabning uden Vedhæng eller Tentakler er anbragt, ikke ganske frem til Kapperanden. Den indtager formedelst dens Smalhed kun liden Plads i Kappens Hule, hvor den sædvanlig er bøiet til den ene Side, saaledes at Munden ligger tæt hen imod den kortere Side af Kappen (se Fig. 3).

Fra Mavens noget udvidede Grund løbe 4 linieformige hyaline Radiærcanaler (Fig. 2, 3, d, d) i lige Afstand fra hverandre langs ad Kappens indre Flade (Subumbrella) hen til dens Rand, hvor de ende hver med en rundagtig blodrød Opsvulmning (Bulbus) (*h, h*), hvilke forbindes ved en circulær Randcanal. Kappens Aabning er indentil garneret med den hos alle lavere Meduser forekommende tynde ringformige Randhud (Diaphragma, Velum) (Fig. 2, c).

Af de nys nævnte 4 røde Opsvulmninger (Bulbi) ere de 3 (Fig. 2, 3, h, h) af ens Størrelse, smaa, rundagtige og indsænkede (ikke hævede over Hudens Overflade); men den fjerde (*g*) stor, langt fremragende og trelappet; fra den ydre Ende af hver af disse Lappe (Fig. 5), af hvilke den midterste (*g*) er størst og pæreformig (Spidsen udadvendt), Sidelappene (*g' g'*) neppe halvt saa store og aflange, udgaar der en lang Randtraad (Fig. 2, 3, f). Disse 3 Lappe ere derfor egentlig at betragte som fortykkede Rødder af Randtraadene. Denne trelappede Opsvulmning, hvori Steenstrup (l, c, pag. 23) formoder at Genitalierne udvikle sig, var hos de iagttagne Individer indvendig fyldt med en celluløs af runde Smaablærer bestaaende Masse (se Fig. 5), som dog ikke viste noget Spor af Kjønsstoffer. De 3 øvrige Bulber, som ere flere Gange mindre end den trelappede, udsende ingen Randtraade.

Alle 3 Randtraade (Fig. 2, 3, f) ere af lige Størrelse, i udstrakt Tilstand 5—6 Gange længere end Kappen, traaddannede, overmaade tynde og hyaline; under Dyrets Bevægelser, som ere temmelig livlige, opvikles de gjerne i talrige smaa løse Spiraler ligesom en udtrukken Skrue. Betragtede under Mikroskopet (Fig. 5, f & Fig. 6) vise de sig i deres hele Længde besatte med meget smaa blæreformige Nesselkapsler, hvilke samle sig til ophøiede Ringe (Fig. 6, a, a) stillede i regelmæssig Afstand fra hverandre og, som det forekom mig, kun paa den ene Side af Randtraadene. En lignende ringet Anordning af Nesselkapslerne vise, som ovenfor allerede er omtalt, de nederste Tentakler hos Corymorpha annulicornis, og Cobbald afbilder Randtraadene af Thaumantias achroa ganske ligedan (Qvart. Microskop. Journal, 1857, No. 21, Tab. 1, Fig. 3, 4).

Jeg fandt denne lille smukke Meduse svømmende nær ved Søens Overflade ved Florøen i Søndfjord den 9de Mai 1836 i 3 fuldkommen med hverandre overensstemmende Exemplarer. Den 26de Mai 1838 fandt jeg atter 3 Exemplarer, af hvilke det ene i alle Henseender lignede de ovenfor beskrevne; men de 2 andre, som vare ganske lidt mindre, havde kun en eneste Randtraad udgaaende

interior cavity of a form corresponding to its exterior contour; and its anterior free extremity, where is the simple round oral aperture, without any appendages or tentacles, reaches, when extended, very nearly to the margin of the umbrella. The stomach occupies very little space in the cavity of the umbrella, where it is usually bent to one side; so that the mouth lies close against the shorter side of the umbrella (see fig. 3).

From the somewhat enlarged base of the stomach, 4 linear hyaline radial canals (fig. 2, 3, d, d) run at equal distances from each other, along the interior surface of the mantle (subumbrella) to its margin, where they terminate, each in a roundish blood-red bulb (*h h*); these bulbs are connected by a circular marginal canal. The aperture of the umbrella is garnished inwardly with the thin annular marginal membrane (diaphragm, velum) (fig. 2, c).

Of the 4 red bulbs above mentioned, 3 (fig. 2, 3, h h) are of the same size, small roundish and sunk (not raised above the surface of the skin); but the fourth (*g*) is large prominent and three-lobed; from the outer extremity of each of these lobes (fig. 5), — of which the middle one (*g*) is largest and pear-shaped, (the point turned outwards) the side-lobes (*g' g'*) scarcely half as large and oblong — there issues a long marginal filament (fig. 2, 3, f). These 3 lobes may therefore properly be considered as enlarged roots of the marginal filaments. This three-lobed bulb, in which Steenstrup (l, c, page 23) presumes that the genitals develop themselves, was, in the specimens examined, filled with a cellular substance consisting of small round vesicles (see fig. 5) which did not however exhibit any trace of sexual matter. The 3 other bulbs, which are many times smaller than the three-lobed bulb, do not emit any marginal filaments.

All 3 marginal filaments (fig. 2, 3, f) are of similar size — when extended 5—6 times longer than the umbrella — filiform, extremely thin and hyaline; during the movements of the animal, which are rather lively, the filaments are often coiled in numerous small loose spirals like a drawn out screw. Examined under the microscope (fig. 5, f, fig. 6) they appear in their whole length covered with very small vesicular thread-cells collected into raised rings (or half rings) (fig. 6, a, a) at regular intervals and, as it appeared to me, only on one side of the marginal filaments. A similar annular arrangement of the thread-cells appears, as before mentioned in the lower tentacles of Corymorpha annulicornis; and Cobbald delineates in like manner the marginal filaments of Thaumantias achroa. (Quart. Microscop. Journal 1857, No. 21, Tab. 1, fig. 3, 4).

On the 9. May 1836, I found three perfectly similar specimens of this pretty little Medusa swimming near the surface of the sea at Floröen in Söndfjord. On the 26. May 1838, I found again 3 specimens, one of which resembled in all respects those above described; but the other two, which were very little smaller, had only a single marginal filament issuing from the larger lobed

fra den større lappede Randbulbus. Hos ingen af de iagttagne, forresten overensstemmende, Individer vare Generationsorganer at bemærke. Muligt at disse hos vor Meduse først udvikles i en senere Alder; men der er ogsaa en anden Mulighed, nemlig Forplantning ved Prolification, saaledes som vi kjende den hos flere Slægter af de lavere Meduser, nemlig Lizzia, Sarsia, Thaumantias og Cunina. Det er saaledes ikke usandsynligt, at en saadan hos vor Meduse kan finde Sted og da rimeligvis fra Randtraadenes opsvulmede celluløse Basis (den trelappede Bulbus), ligesom hos Sarsia prolifera Forbes.

Steenstrupia globosa er ved dens næsten kugledannede Form og runde Kuppel noksom adskilt fra de 2 brittiske Arter, S. rubra Forb. og S. flaveola Forb., saavelsom fra den middelhavske S. lineata Leuck. (Archiv f. Naturgesch., 1856, pag. 29, Tab. 2, fig. 6), hvilke alle have en conisk eller tilspidset Kuppel. Den ligner derimod meget mere den af Steenstrup ved Island iagttagne, af Coryne fritillaria Stp. opammede Meduse (som bør hede Steenstrupia fritillariæ Stp.), hvis Kuppel ligeledes er rund, men som afviger fra vor norske ved en forskjellig Form af den store Randbulbus (Steenstrups "lappede Organ"), fra hvilken der kun udspringer 2 Randtraade. Da jeg imidlertid, som ovenfor anført, hos nogle Exemplarer af den norske Form kun fandt en eneste Randtraad, synes det at disse Organer først efterhaanden voxe frem med Alderen, saaledes at den mellemste først viser sig, og derefter de 2 laterale. Man kunde derfor formode, at den mellemste Randtraad hos de af Steenstrup iagttagne Dyr har været affalden, og at saaledes den islandske Form kunde være identisk med den norske. Men saavel Steenstrups bestemte Forsikring, at de 2 Randtraade udspringe fra "Grunden af det lappede Organ", hvorimod de hos den norske udgaa fra de ydre Ender af Lappene og altsaa ere umiddelbare Forlængelser af disse, som ogsaa den meget forskjellige Form af bemeldte Organ, og endelig den hos den islandske Form "ciliered" eller med smaa Tentakler besatte Mundaabning, synes at henpege paa en specifisk Forskjel.

Steenstrupia globosa.

Proles hydriformis ignota.

Proles medusiformis $\frac{1}{8}$pollicaris, pallio globoso-campanulato, hyalino, margine anteriore obliqve truncato, postice rotundato absqve appendice; bulbis marginalibus qvatuor, rubris, æqvidistantibus, de qvorum uno prominente longe majore cirri marginales tres longissimi, basi bulbosa connati, de ceteris tribus vero nulli, exeunt; proboscide cylindrica, rubra, extra marginem pallii non porrecta, ore simplici,

FORKLARING AF FIGURERNE.

Tab. 1, Fig. 1 forestiller Steenstrupia globosa i naturlig Størrelse fra Siden.

Fig. 2. Samme noget forstørret, seet fra den den store Randbulbus modstaaende Side. *a* Kappen eller Umbrella; *c* Manu-

marginal bulb. In none of the specimens observed could any organs of generation be discovered. It is possible that such organs are not developed in this Medusa until it attains a more advanced age; but there is also another possibility, namely propagation by prolification, as observed in several kinds of the lower Medusæ, for instance Lizzia, Sarsia Thaumantias and Cunina. It is thus not improbable that such propagation may take place also in our Medusa; and in that case it would most likely proceed from the enlarged cellular base (the three-lobed bulb) of the marginal filaments, as in Sarsia prolifera Forbes.

Steenstrupia globosa is sufficiently distinguished, by its nearly globular form and rounded cupola, from the 2 British species S. rubra Forbes and S. flaveola Forbes, as well as from the mediterranean S. lineata Leuck. (Archiv. f. Naturgesch., 1856, p. 29, Tab. 2, fig. 6), which all have a conical or pointed cupola. On the other hand it resembles much more the Medusa fostered by the Coryne fritillaria Stp. observed by Steenstrup near Iceland (which ought to be called Steenstrupia fritillaria Stp.) the cupola of which is also round; while the Medusa differs from our Norwegian species in the form of the large marginal bulb (Steenstrup's "lobed organ") whence there issue only 2 marginal filaments. Since however, I found in some specimens of the Norwegian form, (as above stated), only a simple marginal filament, it seems that these organs grow gradually as the age advances; so that the middle one appears first, and afterwards the 2 lateral. It might therefore be supposed that the middle marginal filament in the animals observed by Steenstrup had possibly fallen off; and that so the Islandic form might be identical with the Norwegian. But Steenstrup's distinct assertion that the 2 marginal filaments issue from "the base of the lobed organ", while in the Norwegian species they proceed from the extremities of the lobes and are thus immediate elongations of the same, as also the very different form of the said organ, and finally the oral aperture in the Islandic species being "ciliated" or garnished with small tentacles, seem to indicate a specific difference.

Steenstrupia globosa.

Proles hydriformis ignota.

Proles medusiformis $\frac{1}{8}$pollicaris, pallio globoso-campanulato, hyalino, margine anteriore oblique truncato, postice rotundato absque appendice; bulbis marginalibus quatuor rubris æquidistantibus, de quorum uno prominente longe majore cirri marginales tres longissimi, basi bulbosa connati, de ceteris tribus vero nulli exeunt; proboscide cylindrica, rubra extra marginem pallii non porrecta ore simplici.

EXPLANATION OF THE FIGURES.

Tab. 1, fig. 1 represents Steenstrupia globosa of natural size, side view.

Fig. 2. The same somewhat magnified, viewed from the side opposite to the large marginal bulb: *a*, the mantle or um-

brium; *d, d* Radiærkarrene; *e* Velum; *f* de 3 Randtraade i fuldt udstrakt Tilstand; *g* den store 3lappede Randbulbus; *h, h* de smaa Randbulber.

Fig. 3. Samme seet fra en af de til den store Randbulbus tilgrændsende Sider. *b* Subumbrella; de øvrige Bogstaver som paa Fig. 2.

Fig. 4. Manubrium stærkere forstørret fra Siden. *c* den midterste noget opsvulmede Del af samme; *c'* den simpelt tilrundede Ende med Mundaabningen.

Eig. 5. Den store Randbulbus tilligemed de tilgrændsende Dele stærkt forstørret. *d* et Stykke af det til denne Randbulbus løbende Radiærkar; *f* Basis af de 3 Randtraade med de ringformigt ordnede Nesselorganer; *g* Randbulbens midterste med celluløst Indhold fyldte Lap; *g' g'* de 2 Sidelappe.

Fig. 6. Et Stykke af en af Randtraadene endnu stærkere forstørret. *a, a* de ringformigt ordnede Nesselorganer.

brella; *c,* the manubrium; *d d,* the radial vessels; *e,* the velum; *f,* the 3 marginal filaments fully extended; *g,* the large 3-lobed marginal bulb; *h h,* the small marginal bulbs.

Fig. 3. The same viewed from one of the sides adjoining the large marginal bulb: *b,* the subumbrella; the other letters as in fig. 2.

Fig. 4. The manubrium, more strongly magnified, side view: *c,* the middle somewhat enlarged part; *c',* the simply rounded extremity with the oral aperture.

Fig. 5. The large marginal bulb with adjacent parts, strongly magnified: *d,* a portion of the radial vessel leading to this bulb; *f,* the base of the 3 marginal filaments, with the annularly arranged thread-cells; *g,* the middle lobe of the marginal bulb filled with cellular matter; *g' g',* the 2 lateral lobes.

Fig. 6. A portion of one of the marginal filaments still more strongly magnified: *a a,* the annularly arranged thread-cells.

III. BESKRIVELSE OVER *MYRIOTHELA PHRYGIA (Lucernaria)*, O. FABR. [1])

(Tab. 2, Fig. 29—36).

Syn. *Lucernaria phrygia,* Otto Fabricius, Fauna Grønlandica p. 343.

Candelabrum phrygium Blainville, Manuel d'Actinologie, p. 317.

Myriothela arctica, M. Sars, Zoologisk Reise i Lofoten og Finmarken, p. 14.

Myriothela arctica, Idem, Forh. ved de Skand. Naturforskeres Møde i Christiania 1856, p. 194.

Candelabrum arcticum Agassiz, Contributions to the natural history of the United States, Vol. 4, p. 341.

Denne mærkværdige Hydroide, hvoraf jeg fandt 2 Exemplarer ved Tromsø i Finmarken paa 20—30 F. D., viser vistnok i enkelte Henseender et umiskjendeligt Forvandtskab med Slægterne Coryna og Syncoryna, men er i andre Henseender igjen saa afvigende ikke blot fra disse,

[1]) I Aaret 1850 blev dette Dyr af min Fader (Zoologisk Reise i Lofoten og Finmarken, p. 14) under Benævnelsen Myriothela arctica anmeldt og i Korthed characteriseret som en ny Slægt og Art blandt Hydroiderne, staaende mellem Coryne og Syncoryne, og senere under samme Navn udførligt beskreven (dog uden Afbildninger) i Forh. ved de Skand. Naturf. Møde i Christiania 1856, p. 194. 4 Aar derefter havde han under det næste Naturforskermøde i Kjøbenhavn 1860 Anledning til i det derværende Museums Samlinger at se et Exemplar fra Grønland af den problematiske af O. Fabricius beskrevne Lucernaria phrygia og erkjendte strax i dette Dyr sin Myriothela arctica (se de trykte Forhandl. p. 693), hvorfor ogsaa den ældere Artsbenævnelse, phrygia, maa bibeholdes. Fabricius anfører (*l, c*) om dette Dyr, at han kun provisoriskt har henført det til Slægten Lucernaria, og at det i visse Henseender viser mere Tilnærmelse til Sl. Hydra. Han har saaledes ialfald tilnærmelsesvis havt et rigtigt Begreb om denne Forms systematiske Stilling. Derimod har Blainville flere Aar derefter ganske og aldeles miskjendt dette Dyrs sande Natur, idet han (*l, c*) stiller det som en egen Slægt, Candelabrum, ved Siden af Slægten Sipunculus, og altsaa henfører det til en vidt forskjellig Dyrtype. Da han imidlertid ikke selv havde Anledning til at undersøge dette Dyr, har han kun ganske i Forbigaaende omtalt det med den ovennævnte Bemærkning under sin Artikel, Lucernaria, og har saaledes saa langt fra at opklare denne Forms sande Natur, meget mere stillet den i et endnu mere problematisk Lys. Paa Grund af Prioriteten har dog Agassiz (*l, c*) bibeholdt det af Blainville foreslaaede Slægtsnavn og kalder vort Dyr Candelabrum arcticum, idet han anser det for specifiskt forskjelligt fra den af Fabricius beskrevne Form. Derimod har Th. Hincks nylig i sin History of the British

III. DESCRIPTION OF *MYRIOTHELA PHRYGIA (Lucernaria)*, O. FABR. [1])

(Tab. 2, fig. 29—36).

Syn. *Lucernaria phrygia,* Otto Fabricius, Fauna Grønlandica, p. 343.

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Myriothela arctica, M. Sars, Forh. ved de Skand. Naturforskeres Møde i Christiania, 1856, p. 194.

Candelabrum arcticum Agassiz, contributions to the natural history of the United States, Vol. 4, p. 341.

Although this remarkable Hydroid, of which I found 2 specimens at Tromsö in Finmark at the depth of 20—30 fathoms, shews in some points an unmistakable affinity to the genus Coryna and Syncoryna, it is in other respects again so different, not only from these but from

[1]) In the year 1850 this animal was noticed by my father (Zoologisk Reise in Lofoten og Finmarken, p. 14) under the name of Myriothela arctica, briefly characterised as a new genus and species among the Hydroids, standing between the Coryne and Syncoryne, and subsequently under the same name minutely described (but without delineations) in Forh. ved de skand. Naturf. Möde i Christiania 1856, p. 194. 4 years afterwards he had, while attending the next meeting of the naturalists at Copenhagen in 1860, occasion to see in the collection of the Copenhagen museum, a specimen from Greenland of the problematical Lucernaria phrygia described by O. Fabricius; and he recognised immediately in this animal his own Myriothela arctica (see the printed transactions, p. 693) for which reason also the older specific denomination phrygia must be retained. — Fabricius states (*l. c.*) concerning this animal, that he has only provisionally referred it to the genus Lucernaria, and that in certain respects it exhibits more affinity to the genus Hydra. He had thus, at least approximately, formed a correct idea of the systematic position of this form. But on the other hand Blainville, several years later, entirely mistook the true nature of this animal, placing it (*l. c.*), as a peculiar genus Candelabrum, by the side of the genus Sipunculus, and therefore refers it to an entirely different type. As however he had not himself had occasion to examine the animal, he has only mentioned it, as it were en passant, with the above remark in his article on Lucernaria; and he has therefore — very far from elucidating the true nature of this form — placed it in a still more problematical light. From considerations of priority Agassiz has however (*l. c.*) retained the generic name proposed by Blainville, and calls our animal Candelabrum arcticum, regarding it as specifically diffe-

men fra alle øvrige bekjendte Former, at den vistnok maa danne ikke blot en egen Slægt, men en egen Familie iblandt Hydroiderne.

Dyrets Længde eller Høide er 1—1½", Bredden eller Tykkelsen $\frac{1}{16}$—$\frac{1}{10}$", altsaa colossale Dimensioner for en Hydroide; i contraheret Tilstand er det dog kun halvt saa langt, men saameget tykkere. — Det forefindes altid enkelt eller ene, aldrig, som saa almindeligt blandt Hydroiderne, flere Individer forenede sammen til en Coloni. Dets Krop (Fig. 29, 30) er nøgen eller uden Polypstok, kjødagtig, cylindrisk, oventil noget tykkere, altsaa ganske lidt kølleformig, og paa denne tykkere ydre Ende (Fig. 29, d) forsynet med en lidən cirkelrund Mundaabning, som dog kan udvides betydeligt; den nederste Ende eller Basis er smalere og udsender udadtil en Del frie stolonagtige Traade (Fig. 29, 30, a, b) af samme bløde Beskaffenhed som Kroppen, hvilke med deres ydre Ende (*b*) ere fastvoxne til et eller andet fremmed Legeme, hvortil Dyret saaledes bestandig forbliver fæstet (se Fig. 30). Den øverste Halvdel af Kroppen er overalt rundtom besat med meget talrige (sikkert flere end 100), uden nogen vis Orden adspredte Tentakler (Fig. 29, 30, c c, Fig. 31), hvilke ere meget smaa og korte (i udstrakt Tilstand (Fig. 29) neppe saa lange som Halvdelen af Knoppens Tykkelse), cylindriske og ende med en tykkere kugleformig Knop (Fig. 31, c), som indeslutter talrige Nesselkapsler. Kroppens nederste Halvdel, som mangler Tentakler, er besat med talrige Kjønskapsler, eller, rettere sagt, Kjønsdyr (Fig. 29, g, g). Disse have (Fig. 32), ligesom hos Coryna sqvamata og andre lignende, en kugledannet Form uden Aabning, og indslutte en næsten halvt ind i deres indre Hule fremragende cylindrisk eller noget kølleformig Axe (*b*) (saakaldet Mave), som er en Fortsættelse af Kapselens Stilk (*s*), hvilken igjen er en Fortsættelse af Moderdyrets eller Ammens Krop (Tarmrør, Lovén). Mellem denne Axe og Kapselens ydre temmelig tykke og gjennemsigtige Hud (*p*), som viser en dobbelt Contour (se Fig. 33, 34, p), er det at Kjønsstofferne udvikle sig. —

Hydr. Zoophytes p. 76, og det vistnok med Rette, troet af de ovenanførte Grunde ganske at burde forkaste Blainville's Slægtsbenævnelser som grundende sig paa en ganske forkjert Opfatning af dette Dyr, og heller foretrække det af min Fader givne Navn Myriothela, under hvilket først dette Dyrs sande Natur og Affinitet er bleven opklaret. Denne Forsker feiler imidlertid ganske sikkert ved at identificere den af ham beskrevne Form, der er identisk med Gosse's Spadix purpurea (Ann. Nat. Hist, Vol. 12, p. 125), med min Faders Myriothela arctica. Disse 2 Former ere, som man vil finde ved en Sammenligning af den her meddelte Beskrivelse og de tilhørende Figurer med samme i Hinck's Værk, meget forskjellige, ja saa forskjellige, at det ikke er usandsynligt, at de endog kunde repræsentere forskjellige Slægter. Navnlig er det Tilheftningsmaaden og Gemmestilkenes Form, som er vidt forskjellig hos begge. – Jeg har troet her at burde gjengive ganske ordlydende den af min Fader i Forhandl. ved de Skand. Naturf. Møde i Christiania 1856 meddelte meget udførlige Beskrivelse af dette Dyr, med de fornødne Henvisninger til Figurerne, da der ikke forefindes nogen udførligere Beskrivelse i Manuskript, og jeg selv ikke har havt Anledning til at iagttage dette Dyr.

Udg. Anm.

all other known forms, that it must certainly be regarded as a new genus, and even as a new family among the Hydroids.

The length, or height of the animal is 1—1½"; the breadth or thickness $\frac{1}{16}$—$\frac{1}{10}$"; colossal dimensions for a Hydroid; in its contracted state, however, it is only half as long, but so much the thicker. It occurs always solitary or simply; never, as so usual among Hydroids, in a colony composed of many individuals collected together. Its body (fig. 29, 30) is naked or without polypary, fleshy, cylindrical, somewhat thicker at the upper part, or very slightly claviform; and on this thicker extremity (fig. 29, d) is a small circular oral aperture, which yet may be greatly widened; the inferior extremity or base is more slender; and from it there issue outwards a number of free stolon-like filaments (fig. 29, 30, a, b) of the same soft nature as the body, the outer extermities (*b*) of which filaments are attached by growth to some extraneous body; so that the animal remains constantly fixed (see fig. 30). The upper half of the body is everywhere surrounded with numerous tentacles (certainly more than 100) (fig. 29, 30, c c fig. 31) distributed without any evident order, very small and short, (when extended (fig. 29), scarcely equal in length to half the thickness of the body) cylindrical and terminating in a thicker globular knob (fig. 31, c), which contains numerous thread-cells. The lower half of the body, destitute of tentacles, is covered with numerous sexual capsules, or more properly speaking sexual animals, (fig. 29, g g). These have (fig. 32) as in the Coryna squamata and the like, a globular form without aperture, and contain a cylindrical or somewhat claviform axis (*b*) (the so-called stomach), projecting nearly half-way into their interior cavity, and being the continuation of the stem of the capsule (*s*), which is again a continuation of the body of the parent animal (intestinal tube Lovén). Between this axis and the outer rather thick and transparent skin of the capsule (*p*), which skin exhibits a double contour (see fig. 33, 34, p), the sexual

rent from the form described by Fabricius. On the other hand Th. Hincks has lately in his History of the British Hydr. Zoophytes, p. 76, and certainly with good cause, thought proper, for the reasons above assigned, to reject Blainville's generic denomination as founded on an entirely wrong conception of the animal, and to prefer the name, given to it by my Father, Myriothela, under which the true nature and affinity of this animal were first elucidated. This naturalist however certainly errs in identifying the form described by him, which is identical with Gosse's Spadix purpurea (Ann. Nat. Hist., Vol. 12, p. 125) with my Father's Myriothela arctica. These 2 forms are, as may be ascertained by comparing the description here communicated, and the accompanying figures, with those given in Hinck's work, which are so very different that they might well represent different genera. It is specially in the mode of attachment and the form of the germ-stems, that so wide a difference between the two is exhibited. I have thought it right to give word for word the very elaborate description of this animal communicated by my Father in Forhandl. ved de skand. Naturf. Möde in Christiania 1856, with the necessary references to the figures; as there does not exist any more minute description of it in manuscript; and I have not myself had occasion to examine this animal.

Note of Editor.

Hos det ene af de 2 iagttagne Exemplarer (Fig. 30) vare disse Kjønskapsler mindre og forenede til drueformige Klaser (*f, f*) af Længde som Kroppens Tykkelse eller derover, hvilke i et Antal af over 20 (jeg kunde tælle 23—25), foruden nogle ganske smaa hist og her mellem de større fremvoxende, omgave overalt i forskjellig Høide den nederste Halvdel af Dyrets Krop. Hver af disse Klaser bestod af et forskjelligt Antal af Kapsler (indtil 10) af forskjellig Størrelse, hvilke med en kort Stilk sade fæstede i forskjellig Høide til en længere og tykkere fra Kroppen udgaaende Stilk. Hos det andet Exemplar (Fig. 29) derimod vare Kapslerne eller Kjønsdyrene (*g, g*) for det meste enkelte eller 2 og 2 forenede paa en fælles Stilk (Fig. 33), større (næsten saa lange som Kroppens Tykkelse) og mere udviklede end hine.

Det ene Exemplar var fasthæftet til Stammen af en Sertularia abietina, det andet til en liden Sten. Hos det sidste (Fig. 30) iagttoges bedst Tilheftningsmaaden. Denne finder nemlig, som allerede ovenfor bemærket, Sted ved Hjælp af flere fra den nederste Del af Kroppen udspringende stolonagtige Traade. Disse (*a, b*) ere cylindriske, meget tynde, bløde og brunlighvide ligesom Kroppen, og mere eller mindre lange (de længste vare 4—5 Gange længere end Kroppens Tykkelse). De udgaa alle fra den nederste tilrundede Del af Kroppen, som forøvrigt var løs og ikke paa noget Punkt fæstet til Stenen, i forskjellig Høide uregelmæssigt rundt om Kroppen, og løbe frit og i lige Retning mere eller mindre langt udad og nedad, indtil de naa Stenen, til hvilken de fæste sig eller voxe aldeles fast med deres ydre i en cirkelrund flad Skive udbredte Ende (*b, b*). Denne Skive, som er mere end dobbelt saa stor som Traadens Tykkelse, er langt mere fast end den øvrige Traad, af brunagtig Farve, og synes at være af en hornagtig Beskaffenhed; den er overordentlig stærkt fastvoxen til Stenen og lader sig ikke løse fra denne uden ved Hjælp af Kniven. — Af disse Traade var der hos det omhandlede Exemplar 10, af hvilke de 9 vare fæstede i forskjellig Vidde og i alle Retninger til Stenen, og den tiende til et Fragment af Skallen af en Mytilus edulis. Ved Hjælp af alle disse Traade ligger Dyret, som iøvrigt er utilhæftet, fast ligesom for ligesaa mange Ankere. — Foruden de omtalte 10 bemærkedes imidlertid tæt ovenfor dem endnu flere, hos det ene Exemplar 8—9, cylindriske Traade (*e, e*) af forskjellig Længde, stillede uregelmæssigt og i forskjellig Høide rundtom Kroppen, men dog alle kortere og tykkere end hine (sandsynlig befandt de sig i en contraheret Tilstand), hvilke stode ud fra Kroppen uden at være tilheftede med deres frie ydre simpelt tilrundede Ende, som manglede den føromtalte Skive. Man kan neppe tvivle om, at ogsaa dette Slags Traade, hvilke synes at være af ganske samme Beskaffenhed som hine først omtalte, jo ligeledes ere bestemte til Anheftning for Dyret [1]).

[1]) Den her skildrede Tilheftningsmaade, hvormed ogsaa Fabricius's Angivelse "basi bysso fixa" synes temmelig godt at stemme

matter develops itself. In one of the 2 specimens observed (fig. 30), these sexual capsules were smaller and congregated in clusters like grapes (*f f*), the clusters being in length equal to the thickness of the body, or even longer, and in number above 20 (I counted 23—25), besides some very small ones growing here and there among the larger ones, every where surrounding at various heights the lower half of the animal's body. Each of these clusters consisted of a different number of capsules (up to 60) of different size, attached by a short stem at various heights to a longer and thicker stem proceeding from the body. But in the other specimen (fig. 29), the capsules or sexual animals (*g g*) were mostly single or united 2 and 2 on a common stem (fig. 33), larger (nearly equal in length to the thickness of the body) and more developed than the former.

One specimen was attached to the stem of a Sertularia abietina: the other, to a small stone. In the latter (fig. 30) the mode of attachment was best observed. As before remarked, the attachment is effected by means of several stolon-like filaments issuing from the lower part of the body. These filaments (*a, b*) are cylindrical, very thin, soft and brownish white like the body, and more or less long (the longest were equal in length to 4—5 times the thickness of the body). They all proceed from the lowest rounded part of the body, which was otherwise free and not at any point fixed to the stone; they are placed at various heights irregularly round the body, and run freely in a straight direction more or less outwards and downward, suntil they reach the stone, to which they attach themselves, or grow entirely fast, by their flattened disc-like extremities (*b b*). These discs are in width more than twice the thickness of the filament, much firmer than the other part of the filament, of brownish color, and seem to be of a horny nature, they adhere very firmly to the stone, and cannot be detached without the help of the knife. Of these filaments there were in the specimen mentioned 10, of which 9 were fixed, at various distances and in all directions, to the stone, and the tenth to a fragment of the shell of a Mytilus edulis. By means of all these threads, the animal, which is otherwise free, lies fixed as by so many anchors. Besides the 10 mentioned, there were observed, close above them, several more filaments: in one specimen 8—9 cylindrical threads (*e e*) of various lengths, placed irregularly and at various heights round about the body, but all shorter and thicker than those previously described (probably they were in a contracted state) and standing out from the body without being attached by their free outer extremities, which were simply rounded and without the disc above mentioned. It can hardly be doubted that also the filaments of this sort, which are apparently of quite the same nature as those first mentioned, are provided in like manner for the attachment of the animal [1]).

[1]) The mode of attachment here described, with which also Fabricius' statement "basi bysso fixa" seems to agree tolerably well,

Dyrets Bevægelser ere langsomme og træge; ved Irritation forkortes Tentaklerne, Munden tilsluttes og Kroppen trækker sig sammen til omtrent Halvdelen af dens Længde i udstrakt Tilstand, hvorved den tillige bliver saameget tykkere (se Fig. 30). Farven er paa Kroppen lysebrun med mørkere indre Hule efter Kroppens ydre Contourer, Tentaklerne og Kjønskapslerne brunlighvide, de sidste med gjennemskinnende rustbrun indre Axe.

Det Mærkværdigste ved vort Dyr er imidlertid dets Udvikling, hvoraf det lykkedes mig at iagttage en interessant og vigtig Phase.

Medens hos det ene af de 2 observerede Exemplarer (Fig. 30) de drueformige Kjønskapsler eller Kjønsdyr vare smaa og kun lidet udviklede, vare de enkelte eller dobbelte hos det andet (Fig. 29, g, g) meget større og langt mere udviklede. Indeni en af de største af disse sidste Kapsler (Fig. 34) bemærkedes en allerede langt udviklet Unge (*a*), hvilende paa den øverste tykkere Ende af Kapselens cylindrisk-kølleformige Axe (*b*). Denne Unge var kugleformig, gjennemsigtig hvid, uden Mund, besat overalt rundtom med mange uden Orden adspredte, forholdsvis temmelig store, cylindriske, i en kugleformig Knop endende Tentakler, og saa stor, at den næsten udfyldte det hele store Rum mellem den øverste Ende af Axen og Kapselens ydre Hud (*p*), som dens Tentakler overalt stødte an imod. I noget mindre Kapsler fandtes en ganske lignende mindre Unge med færre Tentakler (Fig. 33), og i de mindste (Fig. 32) endelig var der intet Spor af nogen Unge at bemærke.

Paa Bunden af det Kar, hvori jeg havde Dyret staaende i Søvand, bemærkedes nogle allerede udklækkede Unger (Fig. 35, 36). Disse lignede ganske de ovenfor beskrevne i Kapslerne indsluttede, med den Forskjel, at de vare endnu større (omtrent $\frac{1}{16}$" lange og næsten halvt saa tykke), Kroppens Form ikke længere kuglerund, men oval eller elliptist, og Tentaklerne talrigere. Antallet af disse sidste (*c, c*) er vanskeligt at angive nøiagtigt; der syntes mig imidlertid at være mindst 50, af hvilke de største eller mest udstrakte havde en Længde omtrent som Trediedelen af Kroppens Brede, andre vare mindre

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overens, er, som man ser, ganske og aldeles forskjellig fra hvad Tilfældet synes at være hos den brittiske Form, hvor der, saavel efter Gosses som Hincks's Meddelelser, findes et virkeligt chitinagtigt Polyparium, der et Stykke kryber henad Stene og andre fremmede Gjenstande, hvortil det umiddelbart er fæstet, inden den egentlige Polyp reiser sig iveiret. Naar hertil kommer den meget ulige Form af Gemmestilkene, der hos den brittiske Form ere meget stærkt forlængede og tynde, fuldkommen coryneagtige med den øverste Del forsynede med enkelte spredte med en Knop endende Tentakler, nedenfor hvilke først de egentlige Gemmer ere fæstede, synes det virkelig som om vi her havde Repræsentanter af 2 omend nærstaaende saa dog distincte Slægter for os. I saa Fald vilde altsaa Familien Myriothelidæ Hincks komme til at indeholde 2 Slægter, hver repræsenteret af en enkelt Art, nemlig Sl. Myriothela Sars med Arten phrygia Fabr. og Sl. Spadix Gosse med Arten purpurea Gosse eller rettere Cocksii Vigurs.

Udg. Anm.

The movements of the animal are slow and sluggish; when it is irritated the tentacles are shortened; the mouth is closed, and the body is contracted to about half its extended length, whereby it becomes likewise so much thicker (see fig. 30). The color of the body is light-brown with a darker interior cavity corresponding in contour to the surface-outline; the tentacles and the sexual capsules brownish white; the latter with transparent rusty brown interior axis.

The most remarkable feature in our animal is however its development, of which I had occasion to observe an interesting and important phase.

While in one of the 2 specimens noticed (fig. 30), the clustered sexual capsules or sexual animals were small and only slightly developed, the single or double ones in the other (fig. 29, g g) were much larger and far more developed. Inside of one of the largest of these last capsules (fig. 34), an already well developed embryo (*a*) was observed resting on the upper thicker end of the cylindrico-claviform axis (*b*) of the capsule. This embryo was globular, transparent white, without a mouth, covered everywhere all round with numerous proportionately large cylindrical tentacles, which terminated in a knob and were distributed without apparent order. It was so large as nearly to occupy the whole space between the upper end of the axis and the exterior skin of the capsule (*p*), with which the tentacles everywhere came in contact. In somewhat smaller capsules, there was a precisely similar smaller embryo with fewer tentacles (fig. 33), and finally in the smallest (fig. 32), there was no trace of any embryo observable.

At the bottom of the vessel, where I had the animal standing in sea-water, I observed some young ones already hatched (fig. 35, 36). They resembled exactly those contained in the capsules above described, with this difference that they were still larger (about $\frac{1}{16}$" long and nearly half as thick). The form of the body was no longer globular, but oval or elliptical; and the tentacles were more numerous. The number of these latter (*c c*) can not well be stated accurately; there appeared to me to be at least 50 of which the largest, or most extended, were equal in length to about one third part of the

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is evidently quite different from what appears to be the case in the British form, in which, according to both Gosse's and Hincks' communications, there exists a real chitinous polypary immediately fastened to, and creeping for a part of its length along stones and other extraneous substances, before the proper polyp becomes erect. And when we further consider the very dissimilar shape of the reproductive stalks, which in the British form are very elongated, perfectly coryne-like and have on the upper part some isolated knobbed tentacles with the proper gonophores attached below — it seems really as if we had here before us the representatives of 2 distinct, although related genera. In this case the family Myriothelidæ Hincks would contain 2 genera, each represented by a single species, namely the genus Myriothela Sars, species phrygia Fabr., and the genus Spadix Gosse, species purpurea Gosse or more properly Cocksii Vigurs.

Note of the Editor.

og viste sig som mere eller mindre langt fremragende kortstilkede Knopper. De stode, ligesom tidligere, adspredte overalt paa Kroppen uden nogen synbar Orden. Den ene Ende af Kroppen (*a*) bemærkedes at gaa ud i en fremstaaende conisk Knude, som var mere end dobbelt saa tyk som Tentaklernes Endeknop, og hvis afstudsede Ende syntes at have en cirkelrund Fordybning ligesom en Sugeskive. Det er formodentlig med denne Ende at Ungen senere hefter sig fast. Den anden modsatte Ende (*b*) var tættere end den hele øvrige Krop besat med Tentakler, hvilke ogsaa der vare stillede mere krandsformigt om dens Midtpunkt, hvor der dog endnu ikke viste sig noget Spor af Mundaabning, og vare mindre, ligesom om de især herfra voxede frem. Det synes at disse Unger, ved saaledes efterhaanden at voxe i Længderetningen og fæste sig med den ene eller bageste Ende, snart opnaa en fuldkommen Lighed med Moderdyret eller Ammen, saa at her kun en ufuldkommen Generationsvexel finder Sted.

Man ser af den foregaaende Fremstilling, at Udviklingen hos Myriothela paa en mærkværdig Maade afviger fra samme hos alle andre hidtil bekjendte Arter af Coryneernes Familie, hvortil dette Dyr efter dets hele Bygning dog nærmest slutter sig. Nogle Coryneer producere nemlig, som bekjendt, Kjønsdyr, der udvikle sig til virkelige Meduser, som løsne sig fra deres Ammedyr og senere i den frie Tilstand frembringe i sig Kjønsstoffer og derved en infusorielignende, med Fimrehaar (Cilier) besat Yngel (den saakaldte Planula), hvilken efter en kort sværmende Tilstand sætter sig fast for at udvikle sig til Ammedyrets Form igjen. Andre frembringe saakaldte Kjønskapsler eller ufuldkomne medusoide Kjønsdyr, hvilke stedse forblive i continuerlig Sammenhæng med deres Ammedyr og aldrig løsne sig fra det, men i denne Tilstand udvikle i sig Kjønsstoffer og derved en lignende infusorieagtig Yngel som hos hine, hvilken gjennemgaar den samme Udviklingsmaade for efter en kort sværmende Tilstand igjen at vende tilbage til Hydroideformen.

Den unge Myriothela gjennemgaar intet saadant sværmende infusorieagtigt Udviklingsstadium; den erholder allerede tidligt sine blivende Tentakler og udvikler sig allerede indenfor Kjønskapselen til en formelig ung Hydroide. Myriothela forholder sig altsaa i denne Henseende ganske som nogle Arter af Slægten Tubularia (medens andre udvikle fuldkomne meduseagtige Kjønsdyr, der forholde sig som de lignende hos mange Coryneer), nemlig Tubularia larynx, og Slægten Hydra, hos hvilke Ungerne ligeledes allerede i det Indre af Kjønskapslerne udvikle sig til unge Hydroider, idet de overspringe den første infusorieagtige Embryontilstand.

Denne Slægt vil kunne diagnoseres saaledes:

Genus *Myriothela,* Sars.

Animal solitarium, nudum, cylindraceum, appendicibus cirriformibus liberis ab inferiore parte corporis exeuntibus

width of the body; others were smaller, and appeared like more or less prominent short-stalked buds. They stood, as before, distributed everywhere on the body without apparent order. One end of the body (*a*) was observed to extend itself in a projecting conical tubercle, which was more than twice as thick as the terminal knob of the tentacles, and at the truncated extremity of which there appeared to be a circular hollow like a sucker. It is probably by this extremity that the young animal fixes itself. The other opposite extremity (*b*) was more thickly covered with tentacles than all the rest of the body; and the tentacles were also placed more regularly around its central point, where no trace of an oral aperture was yet visible; and they were smaller at this place, as if they grew out specially therefrom. It appears that these young ones, thus gradually growing in the longitudinal direction, and attaching themselves by the posterior extremity, soon acquire a complete resemblance with the parent or nursing animal; so that only an imperfect alternation of generation takes place.

It may be seen from the foregoing description, that the development of the Myriothela differs in a remarkable manner from that of all the hitherto known species of the Corynidæ family, with which this animal has, according to its whole structure, the closest affinity. Some Corynæ produce, as is well known, sexual animals, which develop themselves into real medusæ, detach themselves from the parent animal, and afterwards in the free state produce in themselves sexual matter, and thereby generate young infusoria-like ciliated animals (the so-called planulæ) which latter, after spending a short time in a roving state, attach themselves in order to develop themselves again into the form of the parent animal. Others again produce the so-called sexual capsules, or imperfect medusoid sexual animals, which remain always in continuous connexion with the parent animal and never detach themselves, but in this state develope in themselves sexual matter and thereby generate a similar infusorial offspring, which goes through the same phases of development, and after a short time spent in a roving state, returns again to the hydroid-form.

The young Myriothela goes through no such roving infusorial phase of development; it receives at an early period its permanent tentacles, and is developed already within the sexual capsule to a regular young Hydroid. The Myriothela is therefore in this respect quite like some species of the genus Tubularia (while other species develope perfect medusa-like sexual animals similar in life and growth to those of many Corynidæ) for instance Tubularia larynx and the genus Hydra, in which the offspring are likewise developed into Hydroids while within the sexual capsules, escaping the preparatory infusorial state.

This genus may be thus diagnosticated.

Genus *Myriothela,* Sars.

Animal solitarium, nudum, cylindraceum, appendicibus cirriformibus liberis ab inferiore parte corporis exe-

et apice disciformi corneo alienis corporibus adnatis affixum. Tentacula numerosa brevissima apice globoso, in parte corporis superiore undiqve sparsa. Os terminale. Animalia generationis (capsulæ sic dictæ) numerosa, sessilia (nunqvam decidua), globosa absqve ore, breviter pedicellata, singula, dupla aut in pedunculis racematim coacervata, in inferiore parte corporis sparsa. In hisce capsulis, velut in Tubulariis qvibusdam et Hydris, pullus evolvitur animali nutrici similis, globosus seu ovalis, tentaculis cylindricis apice globoso undiqve sparsis ornatus.

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FORKLARING AF FIGURERNE.

Fig. 29 forestiller *Myriothela phrygia* i fuldt udstrakt Tilstand, noget forstørret. *a, a, a* Rodtrevler, hvormed Dyret er befæstet til fremmede Gjenstande; *b, b, b* disses hornagtige Endeskive; *c, c* de talrige til den øverste Del af Kroppen fæstede Tentakler; *d* den øverste eller forreste Ende af Kroppen med Mundaabningen; *f, f* smaa fremspirende Kjønskapsler ved Basis; *g, g* fuldt udviklede enkeltvis eller 2 paa en fælles Stilk staaende Kjønskapsler.

Fig. 30. Et andet Exemplar fæstet til en Sten i contraheret Tilstand. *a, a* Rodtrevler; *b, b* disses Endeskive; *c, c* den forreste stærkt contraherede Ende af Kroppen med de ligeledes contraherede Tentakler; *e, e* fremvoxende i Enden simpelt tilrundede Rodtrevler, som endnu ikke have fæstet sig; *f, f* uudviklede Kjønskapsler sammenhobede i stor Mængde klasevis omkring Kroppens nedre Parti.

Fig. 31. En Tentakel stærkt forstørret; *c* dens med Nesselkapsler fyldte kugleformige Endeknop.

Fig. 32. En ikke ganske udviklet Kjønskapsel stærkt forstørret; *b* den kølleformige Axe; *p* Kappen eller Kapselens ydre Hud; *s* Stilken.

Fig. 33. To fuldt udviklede kvindelige Kjønskapsler fæstede til en fælles Stilk, af det Fig. 29 afbildede Exemplar. *a, a* Unger; *p, p* Kapslernes ydre dobbelt conturerede Hud; *s* den fælles Stilk.

Fig. 34. En enkelt ligeledes kvindelig Kjønskapsel indeholdende en fuldt udviklet kugleformig Unge, endnu stærkere forstørret. *a* Ungen; *b* Kapselens Axe; *p* dens ydre Hud (Kappen).

Fig. 35 og 36. Nylig udslupne Unger af mere eller mindre aflang Form. *a* den bageste tuberkelformigt fremstaaende og med en Sugeskive forsynede Ende af Kroppen; *b* den forreste noget conisk tilspidsede Ende; *c, c* de overalt paa Kroppen adspredte Tentakler.

EXPLANATION OF THE FIGURES.

Fig. 29 represents *Myriothela phrygia* fully extended, somewhat magnified: *a a a,* rootlets by which the animal is attached to extraneous substances; *b b b,* the horny terminal discs of the rootlets; *c c,* the numerous tentacles on the upper part of the body; *d,* the upper or anterior extremity of the body with the oral aperture; *f f,* small nascent gonophores at the base; *g g,* completely developed gonophores standing singly or 2 on a common stem.

Fig. 30. An other specimen attached to a stone in a contracted state: *a a,* the rootlets; *b b,* the terminal discs; *c c,* the anterior strongly contracted extremity of the body, with the tentacles similarly contracted; *e e,* enascent rootlets, simply rounded at the extremity, not yet fixed; *f f,* undeveloped gonophores clustered in great numbers round the lower part of the body.

Fig. 31. A tentacle strongly magnified: *c,* the globular terminal knob full of thread-cells.

Fig. 32. A gonophore not quite developed strongly magnified: *b,* the claviform axis; *p,* the mantle or outer skin of the capsule; *s,* the stem.

Fig. 33. Two fully developed female gonophores attached to a common stem, from the specimen delineated in Fig. 29: *a a,* the embryos; *p p,* the exterior double-outlined skin of the capsule; *s,* the common stem.

Fig. 34. A single female gonophore containing a fully developed globular embryo, still more strongly magnified: *a,* the embryo; *b,* the axis of the capsule; *p,* its outer skin (mantle).

Fig. 35 & 36. Young animals recently hatched, of more or less oblong form: *a,* the posterior prominent tubercular extremity of the body with sucker; *b,* the anterior somewhat conically pointed end; *c c,* the tentacles distributed all over the body.

IV. BESKRIVELSE OVER *RHIZORAGIUM ROSEUM*,

EN NY SLÆGT OG ART AF HYDROIDER.

(Tab. 2, Fig. 37—43).

Det horn- eller chitinagtige Polyparium af denne Hydroide, som jeg har fundet ved Manger paa 20—30 F. D. levende i stor Mængde parasitisk paa Stilken af Tubularia indivisa (se Fig. 37), bestaar af en cylindrisk, rørformig, meget smal krybende Stolon (Fig. 38, 39, a, a), hvorfra ligeledes rørformige Stilke (ibid. b, b) hæve sig enkeltvis lodrette opad. Den første (Stolonen) kryber eller slynger sig i snart lige snart bugtet Retning langsad og omkring Tubulariens Rør, og afgiver under dens Løb afvexlende paa begge Sider større eller mindre, ligeledes

IV. DESCRIPTION OF *RHIZORAGIUM ROSEUM*,

A NEW GENUS AND SPECIES OF HYDROIDS.

(Tab. 2, fig. 37—43.)

The horny or chitinous polypary of this Hydroid, which I have found at Manger at the depth of 20—30 fathoms, living in great numbers on the stem of Tubularia indivisa (fig. 37), consists of a cylindrical tubular very small creeping stolon (fig. 38, 39, a, a) from which tubular single stems (*b, b*) rise perpendicularly. The former (the stolon) creeps or winds itself in a straight or tortuous direction along and around the tube of the Tubularia; sending out during its course on both sides alternating larger or smaller creeping branches, which now and then

krybende Grene, hvilke af og til danne Anastomoser (se Fig. 38, a, a), Stilkene, som hæve sig opad i større eller mindre Afstand fra hverandre og saaledes danne en eneste Rad langs ad Stolonen og dennes Grene, hvorfra de voxe frem ved Prolification, have ogsaa ganske den samme Beskaffenhed, Form og Tykkelse (se Fig. 39). Man finder dem saaledes af forskjellig Længde (ibid. b, b′—b⁗) fra en neppe synlig rund Knop og indtil 8—10 M.m. lange, medens deres største Tykkelse ikke overstiger $\frac{1}{6}$—$\frac{1}{8}$ M.m. De ere altid enkelte, aldrig grenede, sjeldent eller aldrig lige, men altid mere eller mindre bugtede, jævntykke overalt, deres Overflade næsten glat eller kun med svage Rynker hist og her (Fig. 40, b), aldrig med Ringe som hos Eudendrium ramosum, og, ligesom den krybende Stolon, af en meget svag lys gulagtig Farve og ganske gjennemsigtige. Stolonen saavelsom Stilkene indslutte Polypernes tynde cylindriske Del, ved hvilken alle Polyperne i en Coloni ere forbundne med hverandre, og som indeholder en Hule, hvori en Vædske circulerer, der tjener til den hele Polypstoks Ernæring. Denne cylindriske Del (Fig. 40, e) (det af Lovén saakaldte Tarmrør) udvider sig ved den øverste Ende af Stilkene (ibid. i) og kommer frem udenfor disse Rør som det saakaldte Polyphoved (capitulum) eller Polypernes nøgne øverste Del. Denne (Fig. 39, 40, c) er bleg minierød, kølleformig, dobbelt eller undertiden tredobbelt saa tyk som Stilken; den er nemlig meget contractil og derfor snart (i udvidet Tilstand) langstrakt eller tenformig (Fig. 39, c), snart (ved Contraction) omvendt pæreformig (*b′*) eller endog næsten kugleformig (*b″*). Rundt om Midten af denne kølleformige Del staar en enkelt Kreds af traadformige, imod den ydre Ende efterhaanden noget tyndere Tentalker (Fig. 39, 40, d, d). Disse, som i deres Indre vise store langstrakte Celler i Tværretning, have omtrent $\frac{1}{7}$—$\frac{1}{8}$ af Stilkens Længde, og ere vel bløde, men temmelig rigide og lidet følsomme for ringere Irritationer; naar disse imidlertid blive stærkere, forkorte de sig langsomt og betydeligt, idet de tillige alle bøie sig indad imod Munden, som er en cirkelrund Aabning paa Toppen af Køllen, hvorved denne sidste næsten faar Formen af en Kugle (Fig. 39, f) besat oventil med en Hob smaa Knopper, som ere de contraherede Tentakler. Man ser saaledes, at Tentaklerne vel ere contractile, men ikke retractile d. e. kunne ikke drages ind i Køllen, ligesom denne heller ikke kan trækkes ind i Stilkens Rør. Tentaklernes Antal var hos de fleste Polyper 8 eller 10, kun hos et eneste Individ fandtes 12; yngere Polyper have færre, 7 eller 6. Da Tentaklerne ere stillede i en Kreds i Tværretning rundt om Midten af Køllen, rager dennes øverste Del, paa hvis Top (Fig. 40, h) Mundaabningen findes, frem over Tentakelkrandsen som en conisk Proboscis, som imidlertid, da den er meget contractil, snart er langstrakt og smal, snart kort og tyk; det er saaledes alene denne Del, ikke den under Tentakelkredsen, som bevirker de ovenfor omtalte forskjellige Former af Køllen. Den i Stilken indeholdte cylindriske Dels (Tarmrørets) Hule (Fig. 40, e) ser man gaa over i Køllen (ibid. i) og udvide sig stærkt efter

form Anastomoses (see fig. 38, a, a). The stems, which issue upwards at a greater or less distance from each other, and thus form a single row along the stolon and its branches, whence they proceed by prolification, have also quite the same nature, form and thickness, (see fig. 39). We find them thus of various lengths (ibid b, b′—b‴) from a scarcely visible round bud, up to 8—10 M.m. long; while their greatest thickness does not exceed $\frac{1}{6}$—$\frac{1}{8}$ M.m. They are always single, never branched, seldom or never straight, but always more or less bent, of equal thickness in every part; their surface is nearly smooth, or only with slight furrows here and there (fig. 40, b), never with rings, as in Eudendrium ramosum, and, like the creeping stolon, of a very pale light yellow color and quite transparent. The stolon and the stems contain the thin cylindrical part by which all the polyps in a colony are connected with each other, and in the cavity of which there circulates a liquid that serves to aliment the whole polypary. This cylindrical part (fig. 40, e) (the intestinal canal as Lovén calls it) is enlarged at the upper end of the stem (ibid i), and projects outside of these tubes as the so-called Polyp-head (capitulum) or the naked superior part of the polyps. This head (fig. 39, 40, c) is of a pale minium-red color, club-shaped, twice, or sometimes three times as thick as the stem; it is very contractile, and therefore sometimes (when extended) elongated or fusiform (fig. 39, c) sometimes (when contracted) inversely pear-shaped (*b′*) or even nearly globular (*b″*). Round about the middle of this claviform part, there is a single circular row of filiform tentacles slightly tapering towards the outer extremity (fig. 39, 40, d, d). These tentacles, which exhibit, in their interior, large elongated cells placed transversely, are about $\frac{1}{7}$—$\frac{1}{8}$ of the length of the stem; and although soft are rather rigid, and not very sensitive to slight irritation; but when strongly irritated they contract themselves slowly and considerably, curving themselves at the same time in towards the mouth, which is a circular opening at the top of the club, whereby the latter assumes almost the shape of a ball, (fig. 39, f) having on the top a number of small knobs, which are the contracted tentacles. It thus appears that the tentacles, though contractile, are not retractile; i. e. they cannot be withdrawn into the club, nor can the latter be drawn into the tube of the stem. The number of the tentacles was in most of the polyps 8 or 10; only in one individual there were 12; younger polyps had fewer, 7 or 6. As the tentacles are placed in a ring transversely round about the middle of the club, the higher part of the latter, at the top of which (fig. 40, h) is the oral aperture, projects above the circular row of tentacles like a conical proboscis, which however, being very contractile, is sometimes elongated and thin, sometimes short and thick. It is therefore this part only, not the part below the tentacles, which causes the shape of the club to vary as above noticed. The cavity of the cylindrical part contained in the stem (the intestinal canal) (fig. 40, e), is seen continued in the club (ibid, i) and enlarged, conformably with the

dennes ydre Contourer, saa at derved dannes en vid sæk- eller tenformig Hule (Polypens saakaldte Mave eller rettere Kropshule), som aabner sig paa Toppen (*h*) gjennem Munden.

Det, som imidlertid mest udmærker denne Hydroide, er dens saakaldte Generationskapsler eller, som vi hellere ville benævne dem, Medusegemmer eller den af Polyperne opammede anden Generation (Proles medusiformis). Disse (Fig. 38, 39, l, k) ere nemlig for det første overordentlig store, indtil 1 M.m. i Diameter, i Forhold til Moderpolyperne, hvis kølleformige nøgne Del (Polyphovedet) kun er $\frac{1}{3}$—$\frac{1}{2}$ M.m. tyk. Dernæst sidde de ikke fæstede til denne sidste, som det sædvanligt pleier at være Tilfældet hos lignende Hydroider (f. Ex. Eudendrium), men paa den krybende Stolon og dennes Grene, ligesom hos min Perigonymus muscoides (Faun. littor. Norv., Vol 1, pag. 8, Tab. 1, Fig. 19—21) og den af Gegenbaur (Zur Lehre vom Generationswechsel, pag. 11, Tab. 1, Fig. 3, 4) under Navn af Syncoryna Cleodora beskrevne Hydroide, som jeg (Bidrag til Kundskaben om Middelh. Litt. Fauna, Nyt Magazin f. Naturv., 1856, 9 B. pag. 42) har vist at burde danne en ny Slægt. Endelig vise de kun en meget ufuldkommen eller rudimentær Medusestructur og nærme sig derved mere til mange Coryniders, f. Ex. Slægten Clava og Rhizogeton. — Disse Medusegemmer sidde, som sagt, langs ad den krybende Stolon og dens Grene, dannende en eneste Rad, enkeltvis i større eller mindre Afstand fra hverandre og sædvanlig kun en, sjeldnere to, i Mellemrummene af to Stilke (se Fig. 39). De ere (Fig. 41—43) nøgne (ikke indsluttede af nogen Hornkapsel), have en næsten kugledannet eller lidt oval Form, og ere fasthæftede ved en kort temmelig tynd Stilk (ibid, s). Deres ydre gjennemsigtige Membran (*p*) (Klokken eller Kappen), som er temmelig tyk og stærk, viser sig som en dobbelt Contour, og er overalt tilsluttet uden nogen Aabning; imidlertid bemærkedes paa nogle af de største af disse Gemmers ydre frie Ende en liden tapformig eller conisk lav Knude (Fig. 42), paa hvilken der, naar Gemmen blev noget comprimeret, viste sig en Aabning (Fig. 43, d), hvoraf Gemmens Indhold, Sæd eller Æg (eller Unger), de sidste stundom hele og ubeskadigede, flød ud. Indeni Gemmens af den ydre Membran (Kappen) begrændsede store Hulrum sees en central Fortsættelse af den i Stolonens Rør indsluttede cylindriske Del ("Tarmrøret"), som forbinder alle Polyperne i en Coloni med hverandre, rage i Form af en langstrakt-conisk eller flaskeformig opak rosen- eller carmosinrød Tap ("Maven") langt frem (i mere end Halvdelen af Hulrummets Længde) (Fig. 41—43, b).

Denne Tap, hvis øverste frie Ende er smalere og tilspidset, den nederste med "Tarmrøret" forbundne tykkere, indslutter en efter de ydre Contourer dannet Hule, som staar i Forbindelse med Tarmrørets. I hint Hulrum mellem denne Tap og Kappen er det nu at Generationsstofferne dannes, og det hos nogle Gemmer kvindelige, hos andre mandlige. Imidlertid findes aldrig begge Kjøn forenede paa en og samme Polypstok, men denne opammer

exterior contour of the same, into a sack-like or fusiform cavity, (the so-called stomach or more properly body-cavity of the polyp) opening at the top (*h*) through the mouth.

But the most remarkable feature of this Hydroid is in its so-called generative capsules, or as we will rather call them medusa-buds or the second generation raised by the polyps (proles medusiformis). These (fig. 38, 39, l, k) are in the first place uncommonly large, (up to 1 M.m. in diameter), in proportion to the parent polyps, the claviform naked part of which (the polyp-head) is only $\frac{1}{3}$—$\frac{1}{2}$ M.m. thick. Secondly they are not attached to the naked part, as usually the case with similar hydroids (for instance Eudendrium) but are situated on the creeping stolon and on its branches, as in my Perigonymus muscoides (Faun. littor. Norv., Vol. 1, p. 8. Tab. 1, fig. 19, 21) and in the Hydroid described by Gegenbaur (zur Lehre vom Generationswechsel, p. 11, Tab. 1, fig. 3, 4) under the name of Syncoryna Cleodora, which, as I have shewn (Bidrag til Kundskaben om Middelh. Litt. Fauna, Nyt Magasin f. Naturv., 1856, vol 9, p. 42) ought to form a new genus. Lastly they exhibit a very incomplete or rudimentary Medusa-structure, wherein they more nearly resemble the generative capsules of several Corynidæ, for instance those of the genus Clava and Rhizogeton. These Medusa-buds are situated, as has been mentioned, along the creeping stolon and its branches forming a single row, separately at greater or smaller intervals, and usually only one, more rarely two in the intervals between two stems (see fig. 39). They are (fig. 41, 43) naked (not enclosed in any horny capsule) have nearly a globular or slightly oval form, and are attached by a short rather thin stem (ibid s). Their exterior transparent membrane (*p*) (the bell or mantle), which is rather thick and strong, appears as a double outline, and is everywhere closed without any aperture; but at the exterior free end of some of the largest of these capsules, a little stud-like or low conical tubercle was observed (fig. 42) on which when the capsule was somewhat compressed, there appeared an opening (fig. 23, d) whence the contents of the germ issued: seed or ova (or embryos) the latter sometimes entire and uninjured. Within the great cavity of the capsule circumscribed by the exterior membrane (mantle), there appears a central continuation of the cylindrical part ("intestinal canal") which connects all the polyps in one colony, — projecting in the form of an elongated-conical or bottle-shaped opaque rosy- or crimson-red stud ("stomach") occupying more than half of the length of the cavity (fig. 41—43, b).

This stud, the upper free end of which is thinner and pointed, and the lower extremity connected with the "intestinal canal", thicker, contains a cavity formed according to the exterior contour and in connexion with that of the intestinal canal. In the cavity between this stud and the mantle, the generative elements are produced: in some capsules the male, in others the female elements. But the two sexes are never found together

altid kun det ene, enten lutter mandlige eller kvindelige Medusegemmer. De sidste (Fig. 42, 43) udmærke sig ved deres livlige rosen- eller carmosinrøde Farve, som især skyldes de saaledes farvede Æg eller Unger (*f, f*). Hos de største af disse kvindelige Gemmer bemærkede jeg 8—10 opak carmosinrøde Æg eller rettere Unger, da de allerede havde mistet deres Æggehud; nogle af disse sidste vare kugleformige, andre ovale eller elliptiske (= den saakaldte Planula) og alle omgave i en tæt Klynge den flaskeformige Tap. Andre mindre Gemmer havde færre Æg eller Unger, og atter andre endnu mindre viste kun den indre flaskeformige Tap og slet ingen Æg omkring den (Fig. 39, k, k).

De mandlige Gemmer (fig. 41) ere kjendelige ved deres blegere, næsten hvide Farve og ringere Størrelse, idet de kun have en Diameter af $\frac{1}{2}$ M.m. Hulrummet mellem den rosenrøde Tap og den gjennemsigtige Kappe var hos disse fyldt dels med klare Smaakugler (Spermatozoidernes Udviklingskugler) dels med hvidagtig Sæd, som bestod af lutter livlig sig bevægende Spermatozoider med langstrakt-elliptisk Krop og haarformig fin Hale.

Man ser, at de beskrevne Medusegemmer vise en meget ufuldkommen Medusestructur, idet de af denne kun besidde Kappen og Maverøret (Tappen), men mangle ganske det hele Karsystem saavelsom Randtraade og Sandseorganer. De staa paa samme lave Udviklingstrin som de ganske lignende, man hos Slægten Clava og mange andre Hydroider har kaldt "Kjønskapsler", og ere saa lidet organiserede, fordi de ikke ere bestemte til at løsrive sig fra Moderdyret og føre et selvstændigt Liv.

Nærværende Hydroide staar af de bekjendte Hydroideslægter nærmest ved Slægten Heterocordyle Allman, fra hvilken den dog betydeligt adskiller sig derved, at Gemmerne ikke staa paa Siderne af særegne Stilke (Gonoblastidier), men ere sessile paa den krybende Stolon. Ogsaa med Slægten Rhizogeton Agassiz (Contrib. to the Nat. Hist. of the Unit. States, Vol. 4, p. 224, Tab. 20, Fig. 17—23) har den nogen Lighed, men adskiller sig ved Hydroideformens langt større Længde og Smalhed og endnu mere ved dens Tentaklers Stilling, hvilke hos Rhizogeton sidde spredte eller stillede spiralformig paa Polyphovedet ligesom hos Clava, samt ved den paa den krybende Stolon siddende Meduseforms i Forhold til Hydroideformen ringere Størrelse d. e. større Korthed og større Brede. Endelig adskiller den sig fra Slægterne Eudendrium Ehrenb. og Atractylis Wright, med hvilke den ogsaa har adskilligt tilfælles ved den meget forskjellige Form og Anordning af Gemmerne.

Vort Dyr passer saaledes ikke rigtigt ind under nogen af de tidligere bekjendte Slægter, men maa ved dets paa den krybende Stolon fremvoxende sessile Gemmer, som have den samme Form og Anordning hos begge Kjøn, danne en egen Slægt, henhørende til Familien Atractylidæ Hincks.

on one and the same polyparium; only those of one sex, that is, either all male medusa-buds or all females, being nursed on the same stock. The females (fig. 42, 43) are distinguished by their bright rosy or crimson-red color, which is chiefly attributable to the colored ova or young animals (*f f*). In the largest of these female capsules I observed 8—10 opaque crimson-red eggs, or more properly embryos, as they had already lost their egg-skins; some of these latter were globular, others oval or elliptical (the so-called planula) and all of them were closely clustered round the bottle-shaped stud. Other smaller germs had fewer eggs or embryos; and some still smaller shewed only the interior bottle-shaped stud, without any surrounding ova (fig. 39, k k).

The male capsules (fig. 41) are distinguishable by their paler nearly white color and smaller size, having only a diameter of $\frac{1}{2}$ M.m. The cavity between the rose-colored stud and the transparent mantle, was in these capsules filled partly with pellucid globules (developing globules of the spermatozoids), partly with whitish seed consisting entirely of lively spermatozoids with elongated elliptical bodies and thin filiforms tails.

It is clear that the medusa-buds here described shew a very imperfect medusa-structure, only possessing the mantle and the manubrium (the stud) and being entirely destitute of the whole vascular system, of the marginal filaments and of the organs of sense. These medusa-buds are in the same low stage of development as those quite similar buds, which in the genus Clava and many other Hydroids have been called "sexual capsules"; and they are so little organised because they are not destined to separate themselves from the parent animal and to lead an independent life.

Of all the known genera of Hydroids, the present Hydroid stands nearest to the genus Heterocordyle Allman, from which however it differs materially in that the capsules are not situated on the sides of special stems (Gonoblastidia) but are sessile on the creeping stolon. It has also some resemblance to the genus Rhizogeton Agassiz (Contrib. to the Nat.-Hist. of the Unit. States, Vol. 4, p. 224. Tab. 20, fig. 17—23) but differs in the far greater length and tenuity of the Hydroid form, still more in the position of its tentacles, (which in the Rhizogeton are scattered, or placed spirally on the polyp-head, as in the Clava, and also in the smaller size (i. e. less length and greater breadth in proportion to the Hydroid) of the medusa-buds on the creeping stolon. Finally it is distinguisable from the genera Eudendrium Ehrenb. and Atractylis Wright, with which it has several points of resemblance, by the widely different form and arrangement of the buds.

Our animal can not therefore suitably be classed under any of the hitherto known genera, but must, by reason of its sessile buds, growing out of the creeping stolon and having the same shape and arrangement for both sexes, form a separate genus belonging to the family Atractylidæ Hincks.

Genus: *Rhizoragium*[1]), Sars.

Polyparium corneum, e tubulo ramoso repente et surculis polypiferis de illo surgentibus, singulis, erectis, filiformibus, non ramosis, constans. Capitula animalium clavata seu fusiformia, non retractilia, medio tentaculis filiformibus uniserialibus circumdata; ore in proboscide prominente terminali. Gemmæ medusinæ (capsulæ generationis sic dictæ) singulæ sessiles, nunqvam caducæ, globosæ seu ovatæ, breviter pedicellatæ, absqve ore et cirris marginalibus, non in capitulis animalium, sed e tubulo repente enascentes, in aliis coloniis omnes masculæ, in aliis feminæ.

Spec. unica R. roseum S.

FORKLARING AF FIGURERNE.

Tab. 2, Fig. 37 forestiller i naturlig Størrelse en hel mandlig Coloni af *Rhizoragium roseum* fæstet til en Tubulariestamme.

Fig. 38. Et Stykke af denne Coloni omtr. 25 Gange forstørret. *a, a, a* de langs Tubulariestammen krybende forgrenede og indbrydes anastomoserende Stoloner; *b, b* de fra disse udspringende polypbærende Stilke; *c, c* Proboscis; *d, d* Tentaklerne; *l, l* fuldt udviklede mandlige Gemmer; *k, k* mindre fremspirende Gemmer.

Fig. 39. En enkelt Stolon med 5 ulige udviklede Enkeltdyr (Polyper) og 4 ligeledes forskjelligt udviklede Gemmer af en kvindelig Coloni. *a, a* Stolonen; *b* en Polyp med fuldt udstrakt Proboscis (c); *d, d* Tentaklerne; *b'* en Polyp med noget contraheret Proboscis; *b''* en Polyp, paa hvilken baade Proboscis og Tentaklerne ere stærkt contraherede; *b'''* en ung Polyp med smaa fremspirende Tentakler (g); *b''''* en endnu mindre fremspirende Polyp, paa hvilken endnu ikke Tentaklerne have dannet sig; *l, l* fuldt udviklede kvindelige Gemmer fyldte med Æg eller Unger; *k, k* mindre Gemmer uden Æg.

Fig. 40. Den øverste Del af en Polyp omtrent 100 Gange forstørret (Tentaklerne ere delvis borttagne for tydeligere at vise Polyphovedets Form). *b* Polypstilkens ydre svagt rynkede Chitinrør; *c* Polyphovedet (capitulum); *d* Tentaklerne; *e* Stilkens indre kjødagtige Axe; *h* Proboscis med Mundaabningen; *i* Basis af Køllen eller det Sted hvor den nøgne Del af Polypen tager sin Begyndelse.

Fig. 41. En mandlig Gemme stærkt forstørret. *b* Manubrium: *p, p* Gemmens ydre Hud (Kappen); *s* Stilken.

Fig. 42. En kvindelig Gemme. *f, f* Æg eller Unger; *b, p, s* som paa Fig. 41.

Fig. 43. En anden kvindelig Gemme svagt comprimeret. *d* den ydre eller øvre noget fremstaaende Ende, paa hvilken der findes en cirkelformig Aabning for Udtømmelsen af Ungerne; de øvrige Bogstaver som paa Fig. 41 og 42.

BESKRIVELSE OVER *PHYSOPHORA BOREALIS*, Sars.

(Tab. 5, Tab. 6, Fig. 1—8).

Forhandl. ved de Skand. Naturf. Møde i Kjøbenhavn 1860, pag. 693.

Christ. Ved. Selskabs Forhandl. 1860, pag. 147—151.

Paa min første Reise til Finmarken i Aaret 1849 fandt jeg svømmende i Søen nær ved Stranden ved Bodø, foruden endel Fragmenter, to temmelig fuldstændige Si-

[1]) *'ράξ 'ραγός* Bær (acinus), *'ραγίον* et lidet Bær.

Genus Rhizoragium[1]) Sars.

Polyparium corneum e tubulo ramoso repente, et surculis polypiferis de illo surgentibus, singulis erectis filiformibus, non ramosis constans. Capitula animalium clavata seu fusiformia, non retractilia, medio tentaculis filiformibus uniserialibus circumdata; ore in proboscide prominente terminali. Gemmæ medusinæ (capsulæ generationis sic dicta) singulæ sessiles nunquam caducæ globosæ seu ovatæ breviter pedicellatæ, absque ore et cirris marginalibus, non in capitulis animalium, sed e tubulo repente enascentes, in aliis coloniis omnes masculæ in aliis feminæ.

Spec. unica R. roseum S.

EXPLANATION OF THE FIGURES.

Tab. 2, fig. 37 represents a whole male colony (natural size) of *Rhizoragium roseum* fixed to the stem of a Tubularia.

Fig. 38. A portion of this colony magnified about 25 times: *a a a*, the branched anastomosing stolons creeping along the stem of the Tubularia; *b b*, the polypiferous stems issuing from the stolons; *c c*, the proboscis; *d d*, the tentacles; *l l*, fully developed male capsules; *k k*, smaller nascent.

Fig. 39. A single stolon with 5 unequally developed individual animals (Polyps) and 4 likewise unequally developed capsules of a female colony: *a a*, the stolon; *b*, a polyp with fully extended proboscis (c); *d d*, the tentacles; *b'*, a polyp with the proboscis somewhat contracted; *b''*, a polyp in which both the proboscis and the tentacles are strongly contracted; *b'''*, a young polyp with small nascent tentacles (g); *b''''*, a still smaller nascent polyp, in which the tentacles are not yet formed; *l l*, fully developed female capsules filled with ova or embryos; *k k*, smaller capsules without eggs.

Fig. 40. The upper part of a polyp magnified about 100 times (the tentacles partly removed in order to shew more clearly the shape of the polyp-head): *b*, the exterior slightly corrugated chitinous tube of the polyp-stem; *c*, the polyp-head (capitulum); *d*, the tentacles; *e*, the interior fleshy axis of the stem; *h*, the proboscis with the oral aperture, *i*, the base of the club, or the place where the naked part of the polyp begins.

Fig. 41. A male capsule strongly magnified: *b*, the manubrium; *p p*, the exterior skin of the capsule (the mantle); *s*, the stem.

Fig. 42. A female capsule: *f f*, ova or young; *b, p, s*, as in fig. 41

Fig. 43. Another female capsule slightly compressed: *d*, the exterior or superior somewhat prominent extremity, where is a circular aperture for the exit of the young; the other letters as in fig. 41 and 42.

DESCRIPTION OF *PHYSOPHORA BOREALIS*, Sars.

(Tab. 5, Tab. 6, fig. 1—8).

Forhandl. ved de Skand. Naturf. Møde i Kjøbenhavn, 1860, p. 693.

Christ. Vid. Selskabs Forhandl., 1860, p. 147—151.

During my first tour to Finmark in the year 1849, I found a number of fragments and two tolerably perfect Siphonophores, floating in the sea near the shore at

[1]) *ραξ ραγος* berry (acinus) *ραγίον* a little berry.

phonophorer, hvilke forekom mig at være to forskjellige Arter henhørende til Slægten Physophora, Forskål, og bleve med en kort Diognose anførte i min Reiseberetning (Nyt Magazin for Naturvidenskaberne, Christiania 1850, B. 6, pag. 158—159). Slægten Physophora var den Tid kun meget ufuldstændigt bekjendt, nemlig alene af de ældre mangelfulde Beskrivelser af Forskål og Péron. Først nogle Aar derefter lærte jeg ved egen Iagttagelse (se mine „Bidrag til Middelhavets Littoralfauna“ 1857, Hefte 2, pag. 60) at kjende den typiske Art, den i Middelhavet ikke sjeldne Physophora hydrostatica, Forskål, som i de senere Aar ogsaa er bleven fuldstændigen undersøgt af Kølliker, Gegenbaur og Claus.

I det største af de tvende fundne Exemplarer, efter hvilket jeg opstillede min *P. glandifera,* havde jeg tidligere troet at se en ganske eiendommelig Art, afvigende fra de øvrige ved Mangelen af de skrueformige, af en Kapsel omhyllede Nesselknopper paa Fangtraadene, hvilke udspringe fra Basis af de saakaldte Sugerør eller polypagtige Maver, som ogsaa her syntes at være ganske ualmindelig smaa. Istedetfor hine Fangtraade fandtes udenfor eller ovenfor og i en temmelig lang Afstand fra de formentlige Sugerør en til disse svarende Rad af tynde, cylindriske, extensible og retractile, simple eller ugrenede Traade, hvis indre Del var besat med talrige Kjønskapsler, medens den ydre Del var svagt zigzagformig bugtet, og i hver Udbugtning viste en meget liden fremragende rundagtig eller kort-cylindrisk Knude. Jeg blev saaledes forledet til at antage disse Traade for de egentlige Fangtraade og de alternerende smaa Knuder paa deres ydre Del for Sugevorter.

Det andet mindre Exemplar, min *P. vesiculosa,* svarede derimod ganske til Charactererne for Slægten Physophora: det havde vel udviklede, store Sugerør eller polypagtige Maver, fra hvis Basis der udgik en lang Fangtraad, besat med Sidetraade, hvilke endte hver i en skrueformig oprullet og af en kapselformig Kappe indesluttet Nesselknop. Ved den senere anstillede omhyggeligere Undersøgelse fandtes dog ogsaa her de ovenomtalte simple, i deres ydre Del med smaa Knuder besatte Traade, hvilke jeg tidligere ikke havde bemærket, da de vare stærkt contraherede og ganske skjulte mellem Kjønsknopperne.

Da jeg nu imidlertid ved egne Iagttagelser havde lært at kjende den middelhavske P. hydrostatica, Forskål, anstillede jeg en fornyet Undersøgelse af mine ved Bodø fundne og i Spiritus ret godt conserverede Exemplarer, hvorved det viste sig, at de tvende formentlige Arter (P. glandifera og P. vesiculosa) i Virkeligheden høre sammen og danne en eneste, fra P. hydrostatica vel adskilt Art, som jeg, istedetfor de tidligere foreslaaede kun lidet betegnende Navne, har kaldt *Physophora borealis.*

Hvad nemlig for det første Sugerørene betræffer, da maa jeg antage, at de, med Undtagelse af et (Tab. 3, Fig. 1—4, a) af betydelig Størrelse (hvilket jeg tidligere feil-

Bodö; these appeared to me to be of two different species belonging to the genus Physophora Forskål, and were with a short diagnosis mentioned in the report of my journey (Nyt Magazin for Naturvidenskaberne, Christiania 1850' Vol. 6, pag. 158—159). The genus Physophora was at that time very imperfectly known and indeed only known through the older incomplete descriptions of Forskål and Péron, It was not until some years afterwards that I became by my own observation (see my "Bidrag til Middelhavets Littoral fauna, 1857, Hefte 2, p. 60) acquainted with the typical species Physophora hydrostatica Forskål, not uncommon in the Mediterranean, which in the course of the last few years has been completely investigated by Kölliker, Gegenbauer and Claus.

I had previously regarded the largest of the two specimens found as an entirely peculiar species (P. glandifera), differing from the others in the absence of the spiral incysted urticary knobs on the tentacular filaments proceeding from the base of the so-called suction-tubes or polyp-like stomachs, which also here seem to be quite unusually small. Instead of this sort of tentacles there were, outside or above and at some distance from the supposed suction-tubes, a corresponding row of the thin cylindrical extensible and retractile, simple or unramified filaments, the interior part of which was covered with numerous sexual capsules, while the exterior part was slightly sinuous or zigzagged, shewing in each sinuosity a very small prominent roundish or shortly-cylindrical tubercle. I was therefore misled to consider these filaments as the proper tentacles, and the alternating small tubercles on their exterior part as suckers.

The other smaller specimen, my *P. vesiculosa* answered on the contrary entirely to the characters of the Physophora: it had well developed large suction-tubes or polyp-like stomachs, from the base of which issued a long tentacular filament covered with lateral threads each ending in a spirally coiled urticary knob enclosed in a capsular mantle. On subsequent more minute observation there appeared also the above-mentioned simple filaments with the small tubercles on their exterior part, which I had not previously remarked, as they were strongly contracted and quite hidden among the sexual buds.

As however I had now by my own observation become acquainted with the Mediterranean P. hydrostatica Forskål, I instituted a new scrutiny of my specimens found at Bodø which had been very well preserved in spirit, and became thereby convinced that the presumed two species (P. glandifera and P. vesiculosa) really belong together and form a single species (quite distinct from P. hydrostatica) which I have called *Physophora borealis* instead of the not very significative name formerly proposed.

In the first place, with respect to the suction-tubes I must presume that with exception of one (Tab. 3, fig. 1-4, a) of considerable size (which I had previously mista ke

agtigt holdt for en Føler) og et andet mange Gange mindre, som ved den senere Undersøgelse bemærkedes nær ved Vegetationspunktet for Skivens Vedhæng, alle vare affaldne paa det største Exemplar (P. glandifera) og med dem tillige Fangtraadene. De smaa coniske Knopper (Fig. 3, 5, b, Fig. 7), hvilke jeg tidligere ansaa for Sugerør i stærk contraheret Tilstand, ere nemlig, som jeg ogsaa hos P. hydrostatica har overbevist mig om, intet andet end de knudeformige Fremragninger af Stammen, hvilke bære Sugerørene. Jeg holder ogsaa de af Gegenbaur (Acta nat. curios. 1859, pag. 71, Tab. 32, Fig. 53, e e) som „polypagtige Maver" beskrevne og afbildede korte sugevortelignende Knopper hos Stephanospira insignis kun for saadanne knopformige Fremragninger, paa hvilke de affaldne Sugerør have været fæstede.

Dernæst med Hensyn til de paa deres indre Del med Kjønsknopper besatte lange extensible Traade (Fig. 1, c c, Fig. 8—13), da har jeg ogsaa fundet dem lignende hos P. hydrostatica, skjøndt jeg ikke kan erindre at have seet dem her saa langt udstrakte eller nedhængende, som hos den nordiske Art. Hos hin som hos denne bære de de mandlige Kjønskapsler, og deres ydre Del er hos begge besat med samme Slags smaa Knuder, som jeg tidligere holdt for Sugevorter, men som vi nedenfor skulle faa at se ikke ere andet end Mærkerne efter de affaldende Kjønskapsler eller de korte Stilke, ved hvilke de sidste have været fæstede til hine Traade.

Paa min anden Reise til Finmarken i 1857 var jeg desværre ikke saa heldig at gjenfinde vor Physophora. Da den imidlertid saavel ved dens Forekomst paa en saa høi Breddegrad (indenfor Polarcirkelen), som ogsaa i andre Henseender frembyder en ikke ringe Interesse, vil jeg her give en, saavidt mit indskrænkede Materiale tillader, udførlig Beskrivelse af den. Fra P. hydrostatica adskiller den sig blandt andet især ved Luftsækkens Form og endnu mere ved Beskaffenheden af den nederste skiveformig udvidede Del af Stammen.

STAMMEN.

Stammen (Coenosarket, Huxley) af det største af mine to Exemplarer havde i levende Tilstand en Længde af omtrent 1½" eller 37—38 Mm., hvoraf den øverste eller proximale Del, Luftsækken, var 6 Mm. lang og 3 Mm. bred, den derefter følgende traadformige Del, som bærer Svømmeklokkerne, 25 Mm. lang og 1 Mm. bred, og den nederste eller distale, blæreformig udvidede Del 6—7 Mm. lang og 12—14 Mm. bred. I stærkt contraheret Tilstand, saasom i Spiritus, forkortes Stammen meget betydeligt, idet dens traadformige Del tillige trækker sig sammen i flere Bugter, hvorved den kun bliver 6—7 Mm. lang, men næsten 2 Mm. bred, og dens nederste blæreformig udvidede Del 5 Mm. lang og 10 Mm. bred, medens Luftsækkens Dimensioner forblive uforandrede.

Luftkammeret (Fig. 1, 2, 4, p.) (Pneumatophoren, Huxley), som indslutter det hydrostatiske Apparat (Pneumatoscysten, H.), er hyalint, og afviger fra samme hos P.

for a feeler) and another many times smaller, which during the more recent examination was remarked near to the vegetation-point for the appendages of the disc, they had all fallen off in the larger specimen (P. glandifera) and with them also the tentacular filaments. The small conical tubercles (fig. 3, 5, b, fig. 7) which I previously considered to be suction-tubes in a strongly contracted state, are in fact, as I have also ascertained in examining the P. hydrostatica, nothing else but the tubercular prominences of the stem which support the suction-tubes. I also hold the short sucker-like knobs in the Stephanospira insignis, delineated and described by Gegenbauer (Acta nat. curios., 1859, p. 71, Tab. 32, fig. 53, ee) as "polyp-like stomachs," to be similar tubercular processes to which the lost suction-tubes had been attached.

Secondly with respect to the long extensible filaments (fig. 1 cc, fig. 8—13) the interior part of which is covered with sexual capsules, I have also found them similar in the P. hydrostatica, although I cannot remember to have seen them so extended or pendent as in the Norwegian species. In both species they bear the male sexual capsules; and their exterior part is in both covered with the same sort of small tubercles, which I formerly considered to be suckers, but which, as will be presently shewn, are nothing but marks after the fallen sexual capsules, or the short stems by which they had been attached to those filaments.

On my second journey to Finmark in 1857 I was unfortunately not able to find our Physophora again. However as this animal is of considerable interest, as well on account of its occurrence in so high latitudes (within the polar circle) as also in other respects, — I shall here give a so far minute description of it as my limited materials will allow. It is distinguished from the P. hydrostatica, more particularly, inter alia, by the shape of the air-chamber, and still more by the nature of the lower disc-like enlarged part of the stem.

THE AXIS.

The Axis (the Cænosarch Huxley) of the larger of my two specimens had, when alive, a length of about 1½" or 37—38 Mm, of which the upper or proximal part, the air-chamber, was 6 Mm. long and 3 Mm. wide; the next following filiform part, which bears the swimming bells, 25 Mm. long and 1 Mm. wide; and the inferior or distal bladder-like extended part 6—7 Mm. long, and 12—14 Mm. wide. In a strongly contracted state, for instance in spirit, the stem becomes considerably shorter; its filiform part contracting itself also in several bends whereby it becomes only 7—8 Mm. long, but nearly 2 Mm. wide; and its lowest bladder-shaped extended part 5 Mm. long and 10 Mm. wide, while the dimensions of the air-chamber remain unchanged.

The air-chamber (fig. 1, 2, 4 p.) (Pneumatophore Huxley) which includes the hydrostatic apparatus (Pneumatocyst H) is hyaline, and differs from that of the P. hydro-

hydrostatica, ifølge Sammenligning af ligestore Exemplarer af begge, ved dets bredere, omvendt pæredannede Form, idet dets nederste Del er stærkt buget, den øverste efterhaanden smalere mod den but tilspidsede Ende; det ligner saaledes mere Luftkammeret af Stephanomia insignis Gegenbaur (l. c. Fig. 53), medens det hos P. hydrostatica (Claus, Zeitschr. für wissensch. Zoologie 1860, Vol. 10, Tab. 25, Fig. 1, 2; Keferstein & Ehlers zool. Beitr. Tab. 1, Fig. 30) er betydeligt smalere eller næsten cylindriskt med jevnt tilrundet øverste Ende. Det viser endvidere stærkt markerede, regelmæssigt i lige Afstand fra hinanden fra Spidsen til Basis løbende opak hvide Længdestriber, i Antal 9 hos det største Exemplar (hos det mindste kunde de ikke tælles, da det hele Luftkammer ved Spiritusens Indvirkning var bleven temmelig opakt), ligesom hos Stephanospira, hvor deres Antal efter Gegenbaur er 8, og hvor de kun forefindes i Luftkammerets nederste Halvdel. Disse Striber, som ikke bemærkedes hos P. hydrostatica (de skulle dog, efter Keferstein og Ehlers l. c. Fig. 30, forefindes hos P. Philippii, Kölliker), ere egentlig verticale mesenterieagtige Skillevægge, som forbinde den indre Sæk, Luftsækken (Pneumatocysten) med Væggene af den ydre Sæk eller Kammeret (Pneumatophoren), og saaledes holde hin i dens Situs, ligesom det er paavist af Huxley hos Agalma breve (Oceanic Hydrozoa Tab. 7, Fig. 2). Luftkammerets Top har en stor cirkelrund purpur- eller brunrød Plet, hvis Pigment er mere sammenhobet eller mørkere i Midten end ved Peripherien; hos det mindste Exemplar bemærkedes i Centrum af denne Plet et overmaade lidet rundt pigmentfrit Sted.

Stammens traaddannede Del (Svømmesøilens Axe, Kölliker), som bærer Svømmeklokkerne, er, ligesom den nederste blæreformig udvidede Del, af en gjennemsigtig lys carmosinrød Farve. Den er dog ikke ganske lige, men svagt dreiet om sin Længdeaxe i nogle faa (2—3) Vendinger. Borttager man Svømmeklokkerne, contraherer Stammen sig meget stærkt, og man bemærker da, at deres Insertionspunkter alle findes langs ad den ene Side af Stammen, paa hvilken de danne en Rad af sammentrykte tilspidsede Flige, der sidde paa en skarp, ved Contractionen mere eller mindre foldet eller kruset Længdekant (Fig. 2, 4, 23, k.), som i Stammens udstrakte, kun meget svagt spiralt dreiede Tilstand (se Fig. 1) altid vender udadtil og strækker sig nedad til den i Skivens Indsnit løbende Længdefure, der ender nær ved Vegetationspunktet for Vedhængene.

Den nederste udvidede Del af Stammen endelig (af Kölliker kaldet „Polypstokken“, af Vogt „Skiven“) har Form af en ovenfra nedad noget sammentrykt Blære eller en tyk, paa begge Sider, især den øvre, stærkt convex Skive, hvis Dimensioner ovenfor ere angivne. Denne Del er hos P. hydrostatica bleven opfattet paa en meget forskjellig Maade af to af de senere Iagttagere af Siphonophorer, Kölliker og Vogt. Den første antager den nemlig for en særegen sækformig Udvidning af Stammen, den sidste derimod for den i en næsten horizontal Bue dreiede,

statica, when equally large specimens of both are compared, by its wider inversely pear-shaped figure, the lower part being strongly inflated, and the upper part gradually thinner towards the obtusely-pointed extremity; it thus resembles more the air-chamber of Stephanomia insignis Gegenbaur (l. c., fig, 53), while in the P. hydrostatica (Claus, Zeitschr. für wissensch. Zoologie, 1860, Vol. 10, Tab. 25, fig. 1, 2; Keferstein & Ehlers zool. Beitr., Tab. 1, fig. 30) it is considerably narrower and nearly cylindrical, with the superior extremity evenly rounded. It further exhibits strongly marked opaque white longitudinal stripes running regularly at equal intervals from the apex to the base, in the larger specimen, 9 in number (in the smaller they could not be counted; the whole air-chamber having become rather opaque under the influence of the spirit) as in the Stephanospira, where their number according to Gegenbaur is 8, and where they only occur in the lower half of the air-chamber. These stripes, which are not observed in the P. hydrostatica (they are said however, according to Keferstein and Ehlers l. c., fig. 30, to be found in P. Philippii Kölliker) are properly vertical mesenteric septa connecting the interior bag, the air-bag (Pneumatocyst) with the walls of the exterior bag or chamber (Pneumatophore) and thus keep it in position, as has been shewn by Huxley in Agalma breve (Oceanic Hydrozoa, Tab. 7, fig. 2). The top of the air-chamber has a large circular purple-or brown-red spot, the pigment of which is more accumulated or darker in the centre that at the periphery. In the smaller specimen, an extremely small circular place free from pigment was observed in the centre of this spot.

The filiform part of the axis (axis of the swimming column Kölliker) which bears the swimming bells is, like the lower bladder-shaped enlarged part, of a transparent light crimson-red color. It is not quite straight, but slightly contorted in some few (2—3) coils. If the swimming bells are removed, the axis contracts itself very strongly; and the insertion points of the bells can then be observed all along one side of the axis' on which they form a row of compressed pointed lobes on a sharp longitudinal ridge (fig. 2, 4, 23, k) more or less folded or corrugated by the contraction. This ridge, when the axis is extended with but a slight spiral twist, (see fig. 1) is always turned outwards, and extends downwards to the longitudinal furrow (which runs in the incision of the disc) and ends near the vegetation point for the various appendages.

The lower enlarged part of the axis (called by Kölliker "the polyparium", and by Vogt "the disc") has the form of a bladder somewhat depressed, or of a thick disc strongly convex on both sides especially on the upper side; and its dimensions have been previously given. This part has in the P. hydrostatica, been regarded very differently by two of the recent observers of Siphonophores, Kölliker and Vogt. The former considers it to be a peculiar sack-like enlargement of the axis; the latter on the contrary regards it as a shortened flattened continuation of the axis twisted

forkortede og affladede Fortsættelse af Stammen, saaledes at dens Form er mere tilsyneladende end virkelig skivedannet. Jeg har allerede andensteds (Bidrag til Middelhavets Littoral-Fauna, 2 Heft. p. 61) erklæret mig for Vogts Opfatning som den rigtige. Buens Concavitet antydes, som Vogt allerede bemærkede, ved en svag Impression eller lav Fure paa den ene Side, og denne Fure betegner Begyndelsen og Enden af den i Centrum forvoxne Spiralbue. Medens nu denne Blære eller Skive hos P. hydrostatica næsten er cirkelrund med en Fure eller et smalt Indsnit paa den ene Side, har den hos P. borealis et dybt og bredt, rundagtigt Indsnit, saa at den derved næsten faar Form af en Nyre, hvis ene Ende er bredere end den ander (se Fig. 2 og 3). Den smalere Ende, som er beliggende noget lavere nede end hin (hvilket ogsaa, skjøndt i ringere Grad, er Tilfældet hos P. hydrostatica), danner Vegetationspunktet, hvorfra de forskjellige Vedhæng spire frem. Her er det altsaa endnu mere tydeligt, end hos den middelhavske Art, at Skiven ikke, som Kölliker troede, er en særegen Dannelse, men kun en stærkt udvidet og i en enkelt næsten horizontal Spiral dreiet Fortsættelse af Stammen. Den indre Bue af denne Spiral betegnes ved det ommeldte Indsnit, medens den ydre bærer de forskjellige Vedhæng. Vegetationspunktet for disse er beliggende paa den venstre Side af Indsnittet, hvor man bemærker de yngste fremspirende Vedhæng, og Stammens Ende paa høire Side af samme og noget høiere oppe end hint. Fra den ene Ende, hvor de største eller ældste Vedhæng findes, aftage disse gradvis i Størrelse henimod Vegetationspunktet, fra hvilket en Fure løber i lige Retning opad til den nederste Ende af den traadformige Del af Stammen. Spiralen er saaledes hos begge Arter *dreiet tilhøire*. De forskjellige Vedhæng danne følgelig ikke, som man tilforn troede (Kölliker, Leuckart) sluttede Kredse, thi disse ere ved Indsnittet afbrudte; de udspringe derimod samtlige, ganske ligesom hos alle andre Physophorider, fra den ene Side af Stammen eller den ydre Omkreds af Spiralen, og danne ogsaa her paa hinanden følgende ligeartede Afsnit, skjøndt disse her ere langt mindre adskilte, end hos de fleste andre Siphonophorer, hvor de fornemmelig hos Diphyiderne opnaa den høieste Grad af Udvikling og Sondring, ja endog selvstændig Existens som frit omsvømmende Individgrupper (de saakaldte Eudoxia, Ersæa & c.)

SVØMMEKLOKKERNE.

Svømmeklokkerne (Fig. 1, 19) (Nectocalyces, Huxley), som angive den traadformige Del af Stammen, vare hos mit største Exemplar 7 (se Fig. 1), hos det mindste 4 i Tallet, de øverste som sædvanlig mindre, de nederste større. Foruden disse fandtes øverst oppe (Colonien altid tænkt svømmende eller svævende i Havet i dens naturlige Stilling) tæt under Luftkammeret, hvor som bekjendt Vegetationspunktet for disse Dannelser er beliggende, en sammentrængt Hob (7—8 i Tallet) af uudviklede Svømmeklokker som fremspirende Knopper af bleg rødlig gjen-

nearly in a horizontal curve, so that its form is more apparently than really disc-like. I have already elsewhere (Bidrag til Middelhavets Littoral-Fauna, 2 Heft., p. 61) expressed myself in favor of Vogt's view as the correct one. The concavity of the curve is indicated, as Vogt already remarked, by a slight impression or low furrow on the one side; and this furrow denotes the beginning and the end of the spiral coil which is concreted in the centre. While this bladder or disc in the P. hydrostatica is nearly circular with a furrow or small incision on the one side, it has in the P. borealis a deep and wide roundish incision, and thereby acquires nearly the shape of a kidney, one end of which is broader than the other (see fig. 2 and 3). The smaller end, which is situated somewhat lower down than the other (as is also the case, although in a less degree, in the P. hydrostatica) forms the vegetation-point, whence the various appendages issue. It is thus more evident here than in the Mediterranean species, that the disc is not, as Kölliker thought, a special formation, but only a much enlarged continuation of the axis coiled in a nearly horizontal spiral. The interior curve of this spiral is indicated by the incision mentioned, while the exterior bears the various appendages. The vegetation-point for the latter is situated on the left side of the incision, where the youngest nascent appendages are observed; the end of the axis being on the right side, and somewhat above the incision. From the one end, where the largest and oldest appendages are situated, they diminish gradually in size towards the vegetation-point, from which a furrow runs in a straight direction upward to the lower end of the filiform part of the stem. The spiral turns therefore *to the right* in both species. The various appendages do not consequently form, as formerly supposed (Kölliker Leuckart) closed circles, for these are interrupted by the incision; but on the contrary they issue all of them exactly as in all other Physophoridæ, from the one side of the stem or from the outer coil of the spiral, and form also here consecutive similar groups; although these are far less distinct than in most other Siphonophores, where, especially in the Diphyides, they attain the highest degree of development and isolation, nay even independent existence, as groups of individuals swimming freely about (the so-called Eudoxia, Ersæa &c.)

THE SWIMMING BELLS.

The swimming bells (fig. 1—19) (Nectocalyces Huxley) which surround the filiform part of the stem, were in my largest specimen 7 in number (see fig. 1); in the smallest 4; the upper ones as usual smaller; the lower larger. Besides these there was at the top part (always supposing the colony to be swimming or floating in the sea in its natural position) close under the air-chamber where, as is well known, the vegetation-point for these formations is situated, a compact cluster of undeveloped swimming bells (7—8 in number) like nascent buds of a pale reddishtransparent

nemsigtig Farve, hvilke ovenfra nedad tiltage i Størrelse og Udvikling. De udviklede Svømmeklokker, som ere fuldkommen farveløse og vandklare, dannede ikke som hos P. hydrostatica en af 2 regelmæssige alternerende Rader bestaaende Svømmesøile, men vare hos den levende og kraftigt sig bevægende Coloni stillede mindre ordentligt eller noget spiralformigt, 4 i en skjævt ovenfra nedad gaaende Rad til den ene, 2 til den anden Side og 1 næsten i en ret Vinkel med hine. De ere (Fig. 19) forholdsvis temmelig store og i deres Form ikke væsentlig forskjellige fra samme af P. hydrostatica, ligesom ogsaa de paa Svømmesækken løbende Canaler eller Kar ganske stemme overens med Gegenbaurs Fremstilling (l. c. Tab. 30, Fig. 34, 35).

FØLERNE.

Følerne (brachia, Leuckart; hydrocysts, Huxley) sidde øverst paa den ydre Bue af Skivens Spiral. Hos de tvende iagttagne Exemplarer vare de fleste og største af dem affaldne; men Mærkerne efter deres Tilheftning (Fig. 6) vare meget tydeligt at erkjende som to tæt sammen siddende, regelmæssigt med hinanden alternerende og i hinanden gribende Rader af svage, ved ophøiede Linier begrænsede Fordybninger af polygonal Form, i den øvre Rad større end i den nedre og i begge efterhaanden mindre henimod Skivens smalere Ende eller Vegetationspunktet. I Centrum af hver af disse Fordybninger bemærkedes en meget liden rund Knop, som er Mærket af det afbrudte fra Stammen ind i Føleren gaaende Ernæringskar. Ganske det samme Forhold har jeg iagttaget hos P. hydrostatica. Der sad endnu igjen 8—10 af de mindre Følere nær ved Skivens smalere Ende, hvilke i contraheret Tilstand vare fra 1 til 5 Mm. lange, og, som jeg ved at afløse nogle af dem overbeviste mig om, fæstede i Fordybningerne af den nedre Rad. Følerne danne altsaa her ligesom hos P. hydrostatica to tæt sammen staaende og med hinanden alternerende Rader, og ere større i den øvre end i den nedre Rad, samt i begge desto større jo længere de ere fjernede fra Vegetationspunktet. De have iøvrigt (Fig. 5, f, Fig. 20) samme foranderlige Form og ormformige tastende Bevægelser, som hos P. hydrostatica; i fuldt udstrakt Tilstand ere de cylindriske med smalere og tilrundet Ende. Deres Basis er skraat afskaaren paa den underste Side; Afskjæringsfladen er oval, omgiven af en ringformig Vulst, og i Centrum sees en liden rund Knop, Mærket af det afbrudte Ernæringskar. Med denne ovale Flade er det at Føleren er fæstet til Skiven. Tæt indenfor eller ovenover Afskjæringen er til Basis af Føleren fæstet en meget tynd Føletraad (Fig. 2, 5, 20, f') ganske ligesom den jeg (Bidrag til Middelhavets Littoral-Fauna 2 p. 60) først har gjort opmærksom paa hos P. hydrostatica, og hvis Tilstedeværelse senere er bleven bekræftet af Gegenbaur, Claus og Huxley. Denne hos Følerne forekommende accessoriske Føle- eller Fangtraad beviser, at Vogt har Uret i at antage Følerne hos Physophora for Dækblade, paa hvilke en saadan Traad aldrig forekommer, skjøndt Følerne hos denne Slægt vel med nogen Grund kunne siges physiologisk at udøve en

color, which increase in size and development from above downwards. The developed swimming-bells, which are completely colorless and pellucid, did not form, as in the P. hydrostatica, a swimming-column consisting of 2 regular alternating rows, but were, in the living and vigorously moving colony, placed less regularly or somewhat spirally; 4 in a row going obliquely from above downwards on one side; 2 on the other side, and 1 nearly at right angles with the latter. They are (fig. 19) relatively rather large, and in form not essentially different from those of P. hydrostatica; as likewise the canals or vessels which run along the swimming-sack agree entirely with Gegenbaur's description (l. c., Tab. 30, fig. 34, 35).

THE FEELERS.

The feelers (brachiæ Leuckart; hydrocysts Huxley) are situated uppermost on the exterior curve of the spiral of the disc. In the two specimens observed, most of them and the largest, had fallen off; but the traces of their attachment (fig. 6) were very plainly perceptible as two rows of slight indentations of polygonal form bordered by raised lines. These rows were close together, alternating with each other and fitting into each other The indentations were larger in the upper row than in the lower; and in both rows gradually smaller towards the narrower end of the disc or the vegetation-point. In the centre of each of these indentations there was observed a very small round boss, a vestige of the broken alimentary vessel running from the stem into the feeler. I have noticed quite the same in P. hydrostatica. There were still 8—10 of the smaller feelers remaining near to the narrower end of the disc; and these feelers were, in a contracted state, from 1 to 5 Mm. long and, as I ascertained by detaching some of them, fixed in the indentations of the lower row. Thus the feelers form here, as in the P. hydrostatica, two rows situated close together and alternating with each other; being larger in the upper than in the lower row, and in both rows so much larger, as they are further removed from the vegetation-point. They have moreover (fig. 5 f, fig. 20) the same mutabe shape and snake-like movements as in P. hydrostatica; when fully extended they are cylindrical, with taper rounded extremities. When detached from the animal their base appears obliquely truncated on the under-side; the plane of truncation, is oval surrounded by an annular ridge, and in the centre there appears a small round eminence, a vestige of the broken alimentary vessel, Close within or above the truncation there is fixed to the base of the feeler a very thin tentacular filament (fig. 2, 5, 20, f') quite like that which I first noticed (Bidrag til Middelhavets Littoral-Fauna 2 p. 60) in P. hydrostatica, and the presence of which has been subsequently confirmed by Gegenbauer, Claus and Huxley. This accessory filament accompanying the feelers; shews that Vogt is wrong in supposing the feelers in the Physophora to be protecting scales, on which such a filament never occurs; although the feelers in this genus may with some

lignende Function af Beskjærmelse for de øvrige Vedhæng, som Dækbladene, hvilke her fattes. Den omhandlede Føletraad er i contraheret Tilstand fra halvt indtil ligesaa lang som Føleren, simpelt cylindrisk med smalere tilrundet Ende, og viser et Antal ringformige Indsnøringer, der, som Claus udtrykker sig, se ud „som Leddene af en Bændelorm.“

Paa den ydre Ende af Følerne bemærkes under Mikroskopet en Hob af omtrent 20 langstrakt-elliptiske Nesselceller (Fig. 21), der indslutte en Nesseltraad af ualmindelig Størrelse. Denne Traad er nemlig, naar den er traadt ud af Cellen og strakt, mere end 1 Mm. lang eller omtrent $^1/_4$ af Følerens Længde; den er bøielig, besat med overmaade smaa runde Knuder, og sidder paa Enden af et næsten dobbelt saa tykt, cylindriskt, stivt Skaft, som rager frem udenfor Enden af den tomme Celle, og omtrent er saa langt som denne. Dette Skaft (Fig. 22) er i dets nederste Halvdel tæt omgivet af en tynd Hud, som i den øverste Del staar langt ud fra Skaftet og antager en tendannet Form af dobbelt saa stor Brede som dette; Overfladen af denne Hud viser talrige, overmaade fine tætte krumme (med Concaviteten nedad vendte) Tværstriber. Yderst ender Skaftet i 2 Spidser eller Smaapigge, hvilke omfatte Basis af den fra dets Top og som en umiddelbar Fortsættelse af denne udgaaende bløde Nesseltraad, og er omtrent ved Midten af dets Længde besat rundtom med et større eller mindre Antal af tilspidsede Børster eller Pigge, der ere $^1/_4$—$^1/_3$ af Skaftets Længde og rettede skraat opad og udad.

SUGERØRENE.

Sugerørene eller de polypagtige Maver (polypites, Huxley) sidde nederst paa den ydre Bue af Skivens Spiral et lidet Stykke ind paa Underfladen. De vare, som allerede ovenfor anført, hos mit største Exemplar alle affaldne med Undtagelse af et større (Fig. 1—4, a), som udstrakt var 15 Mm. langt og i contraheret Tilstand 9 Mm. langt og 2 Mm. tykt, og et andet flere Gange mindre i Nærheden af Vegetationspunktet. Begge havde den sædvanlige langstrakte eller næsten cylindriske, i et inderste (Basaldelen), et mellemste (Maven) og et yderste Afsnit (Snabelen) afdelte Sækform. Mærkerne af de affaldne Sugerør vare imidlertid synlige som en Rad af 16—18 lave (de største $^2/_3$ Mm. lange) coniske Knuder (Fig. 3, b b, Fig. 7) paa Skivens Underside nær ved den ydre Rand eller i nogen Afstand fra Kjønsknopperne; de aftage i Størrelse henimod den smalere Ende af Skiven, hvor de synes at fattes under de nærmest ved Vegetationspunktet fremspirende Kjønsvedhæng. Disse Knuder ere knopformige Fremragninger af Skiven, paa hvilke Sugerørene ere fæstede og maa ikke forvexles med disses hyppig rundagtige Basaldel. Forresten syntes Sugerørene ikke at staa i lige Linie med Kjønsvedhængene, men heller med disses Mellemrum. Hos mit mindste Exemplar, som neppe var halvt saa stort som hint, vare Sugerørene (Fig. 23, a a, Fig. 24, vel bevarede og af rødlig Farve; de største vare i udstrakt Tilstand 10

reason be said physiologically to perform the same function in protecting the other appendages as the scales which are here wanting. The filament mentioned is, in its contracted state' from half to quite as long as the feeler, simply cylindrical with a taper rounded extremity, and shews a number of annular instrictions, which, as Claus expresses himself, "look like the joints of a tape worm." On the outer extremity of the feelers, there appears under the microscope a cluster of about 20 elongated elliptical thread-cells (fig. 21) which inclose an urticary filament of unusual size. This filament is, when protruded from the cell and extended, more than 1 Mm. long, or about $^1/_4$ of the length of the feeler; it is flexible, covered with extremely small round tubercles and situated at the extremity of a cylindrical stiff shaft, nearly twice as thick, projecting beyond the empty cell and about as long as the latter. The lower half of this shaft (fig. 22) is closely surrounded by a thin membrane, which in the lowest part stands far out from the shaft and assumes a fusiform shape of twice the width of the shaft. The surface of this skin shews numerous extremely fine close transverse stripes curved with the concavity turned downward. At its outward extremity, the shaft terminates in 2 points or small spikes enclosing the base of the soft urticary filament that issues from its top in immediate continuation; and about in the middle of its length it is covered round about with a greater or less number of pointed bristles or spikes which are $^1/_4$—$^1/_3$ of the length of the shaft, and directed obliquely upwards and outwards.

THE SUCTION-TUBES.

The suction-tubes or the polyp-like stomachs (polypites Huxley) are situated on the lowest part of the exterior curve of the spiral of the disc, advancing a little on to the under-surface. They had, as already previously mentioned, all fallen off in my largest specimen with exception of a larger one (fig. 1—4, a) which when extended was 15 Mm. long, and when contracted 9 Mm. long and 2 Mm. thick, and another many times smaller in the vicinity of the vegetation-point. Both had the usual elongated or nearly cylindrical sack-form divided into an inner section (the basal part) a middle section (the stomach) and an exterior section (the proboscis). The vestiges of the fallen suction-tubes were however visible as a row of 16—18 low conical tubercles (the largest $^2/_3$ Mm. long) (fig. 3 bb, fig. 7) on the underside of the disc, near to the exterior margin or at some distance from the sexual buds; they diminish in size towards the smaller end of the disc, where they appear to be wanting under the nascent sexual appendages nearest to the vegetation-point. These tubercles are knob-like prominences of the disc, on which the suction-tubes are fixed, and must not be confounded with the often roundish basal part of the latter. Moreover the suction tubes did not appear to stand in a right line with the sexual appendages, but rather in a line with their intervals. In my smaller specimen, which was scarcely half as

Mm. lange og $1^1/_2$ Mm. tykke over Midten, contraherede 5—6 Mm. lange og 2—3 Mm. tykke, altsaa forholdsvis større end hos P. hydrostatica. Deres Endestykke eller Snabelen (Fig. 24, s) viste rundtom 12 regelmæssige opake Længdestriber eller Folder.

FANGTRAADENE.

Fangtraadene (tentacula), som paa mit største Exemplar fattedes, vare paa det mindste overalt tilstede, en for hvert Sugerør, fæstet ved dets Basis umiddelbart over dens Tilheftningspunkt, med Undtagelse af de 2 yngste eller nærmest Vegetationspunktet siddende Sugerør, hvor den endnu ikke var udviklet. Fangtraaden (Fig. 23, 24 t) var i stærkt contraheret Tilstand (i Spiritus), i hvilken den var oprullet i 8—9 vide skrueformige Spiraler, 5—6 Mm. lang og lidt mere end $^1/_2$ Mm. tyk; i levende Tilstand og udstrakt har den sikkert, ligesom hos alle Physophorider, været mangfoldige Gange længere og tyndere. Den er cylindrisk, glat, men ved Contraction tæt ringet, og langs den ene Side besat med en Rad af overmaade tynde secundære Traade, hvilke ende i en saakaldet *Nesselknop;* denne fattes dog paa de inderste eller nærmest ved Basis af Fangtraaden siddende, mindre udviklede Sidetraade. Man kan nemlig her forfølge Nesselknoppens gradvise Udvikling. Først (d. e. inderst ved Fangtraadens Basis, hvor deres Vegetationspunkt er) ere Sidetraadene meget korte og ligesom smaa simple Blindtarme (Fig. 25, 26), hvilke efterhaanden forlænges og afdele sig i en inderste Del (Stilken, Fig. 27—29, a), en midterste tykkere Del (Nesselknoppen, sacculus, Huxley, ibid. *b*) og en yderste Del (Endetraaden, filamentum, Huxley, ibid. *c*). En gjennemsigtig Hud, Begyndelsen til den senere Kapsel eller Kappe (involucrum, Huxley) danner sig imidlertid om den fortykkede Del af Strengen eller Nesselknoppen, som efterhaanden begynder at vise Tegn til Spiraldreining ved 1 eller 2 langt udtrukne Skruevendinger (Fig. 28, 29). Nu optræde Nesselceller, navnlig de store elliptiske saakaldte „gule Celler", i et ringe Antal og uden synlig regelmæssig Anordning i den inderste Del af Skruen. Senere lægge Skruevendingerne, som forøges til 4 eller 5 (hos P. hydrostatica derimod, efter Keferstein og Ehlers, til omtrent 8), sig tæt sammen til hinanden (Fig. 29, 30), idet Kapselen bliver bredere eller oval og Endetraaden efterhaanden drages ind i den, saa at omsider kun en liden to- eller trelappet Del af den (Fig. 31, 31′, c) rager frem ud af en liden paa Kapselens Ende værende Aabning. — Hos de mest udviklede af mig iagttagne Nesselknopper (Fig. 32, 33), var den omhyllende Kapsel mere langstrakt eller elliptisk med smalere but tilrundet ydre Ende. Imidlertid er der foregaaet en Omdreining af den nu fuldkommen af Kapselen omsluttede og 5 Spiraldreininger dannende (intensiv purpurrøde) Streng (det saakaldte Nesselbaand) saaledes, at de store gule Nesselceller, som før laa nærmest ved Kapselens Basis, ere komne til at ligge nærmest ved dens

large as the former, the suction-tubes (fig. 23, aa, fig. 24) were well preserved and of a reddish color; the largest when extended were 10 Mm. long and $1^1/_2$ Mm. thick across the middle; when contracted 5 - 6 Mm. long, and 2—3 Mm. thick, that is relatively larger than in P. hydrostatica. Around the terminal part or proboscis (fig. 24 s) there appeared 12 regular opaque longitudinal stripes or folds.

THE TENTACULAR FILAMENTS.

The tentacular filaments (tentacula), which were wanting in my largest specimen, were all present in the smaller, one for each suction-tube fixed at the base immediately above the attachment of the tube, with exception of the two youngest suction-tubes situated nearest to the vegetation-point, in which two the filament was not yet developed. The filament (fig. 23, 24 t) was in a strongly contracted state (in spirit) and coiled up in 8—9 wide screw-like spirals, 5—6 Mm. long, and a little more than $^1/_2$ Mm. thick; in the living state and when extended it has certainly been, as in all Physophoridæ, many times longer and thinner. It is cylindrical' smooth, but by contraction closely ringed, and along one side covered with a row of extremely thin secondary filaments which terminate in a so-called *urticary knob;* this is however wanting in the interior less developed lateral filaments situated nearest to the base of the tentacle. The gradual development of the urticary knobs can here be followed. First (i. e. innermost near the base of the tentacle where its vegetation-point is) the lateral threads are very short, and like small simple cæca (fig. 25, 26) which gradually become longer and divide themselves into an interior part (the stem fig. 27—29 a) a central thicker part (the urticary bud, sacculus Huxley ibid b) and an exterior part (the terminal thread, filamentum Huxley ibid c.) A transparent skin, the commencement of the future capsule or mantle (involucrum Huxley) forms itself round the thickened part of the chord or the urticary knob, which gradually begins to shew signs of spiral twisting in 1 or 2 long drawn screw-turns (fig. 28, 29). Now the thread-cells begin to appear, especially the large elliptical so-called "yellow cells", in small number and without any apparent regular arrangement in the interior part of the screw. Subsequently the coils of the screw, which are increased up to 4—5 in number (but in the P. hydrostatica according to Keferstein and Ehlers to about 8) lay themselves closely together (fig. 29, 30) while the capsule becomes wider or oval, and the terminal filament is gradually drawn into it, so that at last there is only a small two- or three-lobed part of it (fig. 31, 31′c) projecting from a small aperture at the extremity of the capsule. In the most developed urticary knobs observed by me (fig. 32, 33) the enveloping capsule was more elongated or elliptical with a thinner obtusely rounded outer extremity. In the mean time there has occurred a revolution of the (intense purple-red) chord (the so-called urticary band) — which is now completely enveloped by the capsule and forms 5 spiral coils — so that the large yellow

Ende og nu ere ordnede i en regelmæssig Tværrad, der indtager den $1^1/_2$ sidste Vending af Strengen. Denne Omdreining foraarsages derved, at Stilkens skaalformigt udvidede Ende indgaar i Kapselens Dannelse, og idet den voxer mere og mere langs nedad dennes ene Side (Fig. 31), fører Strengens proximale, ved sine store gule Nesselceller kjendelige Ende med sig, saa at denne omsider kommer til at ligge ved Kapselens distale Ende.

De store gule Celler (Fig. 34) indslutte en i mangfoldige Bugter slynget fin Nesseltraad, som synes at være indplantet paa en tykkere Del ligesom et Skaft, der er beliggende nærmest ved den smalere Ende af Cellen. De talløse Nesselceller, som besætte de øvrige Vendinger, paa hvilke de staa lodrette og tæt sammentrængte, ere meget smaa (Fig. 35), langstrakt-elliptiske og noget bøiede; de syntes at indslutte en mangfoldig spiraldreiet Nesseltraad, som dog kun utydeligt kunde skjelnes.

Ingen af de af mig iagttagne Nesselknopper viste flere end 5 Spiralvendinger; hvormod Claus (l. c. Tab. 26, Fig. 26) hos P. hydrostatica afbilder 9—10 saadanne, og Gegenbaur (l. c. Fig. 42) bemærker, at Spiralen hos de fuldkomneste Nesselknopper opløser sig og ligger sammenslynget i uregelmæssige Vendinger, hvilket ogsaa er synligt hos nogle af de af mig fra Middelhavet hjembragte Exemplarer.

Nesselknopperne af P. borealis afvige fra samme af P. hydrostatica ved Kapselens but tilrundede (ikke tilspidsede) distale Ende, ved Mangelen af de 2 tilspidsede Sideflige, og ved Nesselstrængens ringere Antal af Spiralvendinger.

KJØNSVEDHÆNGENE.

Kjønsvedhængene (Gonophorerne) ere anbragte i Rummet mellem Følerne og Sugerørene, altsaa netop paa Randen af Skivens ydre Bue, et Par for hvert Afsnit. Ligesom alle de før omtalte Vedhæng spire de frem fra den smalere Ende af Skiven og tiltage gradvis i Størrelse mod den bredere. De have ligesom hos P. hydrostatica Form af Drueklaser, idet de talrige Knopper, der indslutte Kjønsstofferne, sidde fast paa cylindriske, fra Stammen (Skiven) udgaaende Stilke (gonoblastidia, Huxley). Hver af disse Drueklaser (Fig. 14) viser sig ved nærmere Betragtning at bestaa af to i Udseende forskjellige Hovedgrene, den ene stillet udenfor eller rettere ovenover den anden, hvilke have deres Udspring saa ganske tæt ved hinanden, at de synes at udgaa fra en fælles Basis. Knopperne paa den øverste Gren (Fig. 14, q), som vender mod Følerne, danne nemlig talrige, meget smaa, tæt sammenhobede rundagtige Bær; men paa den underste (ibid. m.), som vender mod Sugerørene, ere de færre i Antal, større og af langstrakt, næsten cylindrisk Form. Hertil kommer endnu den Forskjel, at den øverste Gren eller Stamme er forgrenet, den nederste derimod simpelt traaddannet. Hin bærer lutter kvindelige, denne lutter mandlige Kjønsknopper.

thread-cells which were previously situated nearest to the base of the capsule, are now situated nearest to its extremity and arranged in a regular transverse row occupying the last $1^1/_2$ coils of the chord. This revolution is caused by the calyx-like enlarged extremity of the stem going into the formation of the capsule, and, while growing more and more along one side of it downwards (fig. 31), carrying in the same course the proximal extremity of the chord — (recognisable by its large yellow thread-cells) — which thus comes at last to the distal extremity of the capsule.

The large yellow cells (fig. 34) enclose a fine urticary filament, twined in many coils, which seems to be planted on a thicker part as if on a shaft situated nearest to the narrower extremity of the cell. The innumerable thread-cells covering the other coils on which they stand perpendicularly and closely compressed, are very small (fig. 35) elongated, elliptical and somewhat curved; they appeared to contain a many-coiled spiral urticary filament, which however could not distinctly be perceived.

None of the urticary knobs observed by me shewed more than 5 spiral coils; but Claus (l. c., Tab. 26, fig. 26) in P. hydrostatica delineates 9—10 of them, and Gegenbaur (l. c., fig. 42) remarks that the spiral in the most perfect urticary knobs becomes decomposed and lies twisted together in irregular coils, which is also apparent in some of the specimens brought home by me from the Mediterranean.

The urticary knobs of the P. borealis differ from those of the P. hydrostatica in the obtusely rounded (not pointed) distal extremity of the capsule, in the absence of the 2 pointed lateral lobes, and in the smaller number of the spiral coils of the urticary chord.

THE SEXUAL APPENDAGES.

The sexual appendages (Gonophores) are placed in the interval between the feelers and the suction-tubes, that is just at the margin of the exterior curve of the disc, a pair for each section. Like all the appendages previously mentioned, they issue from the narrower end of the disc, and increase gradually in size towards the wider end. They have, as in the P. hydrostatica, the form of clusters (bunches of grapes); the numerous buds which contain the sexual matter being attached to cylindrical stalks proceeding from the axis (the disc) (gonoblastidia Huxley). Each of these clusters (fig. 14) is found on closer examination to consist of two main branches differing in appearance, one placed outside of, or more properly above the other, and issuing at first so closely together that they seem to proceed from a common base. The buds on the upper branch (fig. 14, q) which are turned towards the feelers, form numerous very small closely congregated roundish berries; but on the lower branch (ibid. m) which is turned towards the suction-tubes, they are fewer in number, larger and of an elongated nearly cylindrical form. There is also the difference that the upper branch or stem is branched, while the lower on the contrary is simply filiform: the for-

De kvindelige Klaser (Gynophorer, Huxley) (Fig. 1—4, q) have i mest udviklet Tilstand en Længde af 5 Mm. og en Bredde af $1^1/_2$ Mm. i deres ydre Del, men afsmalnes efterhaanden mod deres Basis. De bestaa hver af en Mængde Smaadruer af langstrakt pæredannet eller kølledannet Form (Fig. 16), hvilke sidde tæt sammenhobede overalt rundtom den temmelig tykke, cylindriske, indvendig hule Stilk. Hver af disse Smaadruer dannes af en ligeledes cylinderisk hul, fra Stilken udgaaende tyndere Gren, som rundtom bærer de meget tæt sammen siddende kugleformige eller ganske lidt ovale Knopper (Fig. 17), hvilke ved en kort smal Stilk ere fæstede til Grenen. De yderste Grene ere altid større og bære de mest udviklede Knopper, mod Basis blive de efterhaanden kortere og deres Knopper mindre udviklede. Hver Knop indslutter indenfor et tyndt Hylster kun et eneste kugledannet Æg (Fig. 18) med finkornet gjennemsigtig farveløs Blomme, hvori Kimblæren og især Kimpletten er meget tydelig. I Væggene saavel af Stilken som dens Grene bemærkes tætstaaende longitudinale Muskelfibre, ved hvilke det hele Vedhæng betydelig kan contraheres.

De mandlige Klaser (Androphorer, Huxley) (Fig. 1—4, m) ere smalere end de kvindelige, men i udstrakt Tilstand mange Gange længere, idet de, som allerede ovenfor anført, dannes af en Stilk, som kan udstrækkes til en Længde næsten lige saa stor som Coloniens hele Stamme eller over 30 Mm. og har da Udseendet af en Fangtraad (Fig 1, c), men ved den ringeste Berørelse hurtigt contraherer sig og i denne Tilstand ikke er længere end de kvindelige Klaser. Denne Stilk (Fig. 9—11, c) er simpelt cylindrisk eller traaddannet, ugrenet, indvendig hul, og i dens Vægge bemærkes talrige tætstaaende longitudinale Muskelfibre samt længere fra hinanden staaende Tvær- eller Cirkelfibre, Knopperne eller Sædkapslerne (Fig. 13) sidde fæstede ved en kort og smal Stilk enkeltvis rundt om Hovedstilken; nær ved dennes Basis ere de meget smaa og kugleformige, længere ude blive de efterhaanden større, ovale eller elliptiske, og tilsidst meget store, indtil 2 Mm. lange og cylindriske med but tilrundet Ende, 5—6 Gange længere end tykke og 6—10 Gange længere end de mest udviklede kvindelige Knopper. Deres ydre Hud (calyx, Huxley) er hyalin; den indre, efter de ydre Conturer dannede Kjærne (manubrium, H.), som i sine Vægge indslutter Sæden, er hos de mere udviklede Knopper lys og gjennemsigtig orangegul, hos de mindre udviklede hyalin. Paa den ydre, snart større snart mindre Del af Stilken fattes sædvanlig disse Knopper og istedetfor dem bemærker man mere eller mindre talrige meget smaa, kort-cylindriske Knuder (Fig. 9—11, c, Fig. 12), hvilke, naar Stilken i levende Tilstand er udstrakt, bemærkes, (Fig. 8, c) at være stillede i 2 alternerende Rader, 1 til hver Side, idet Stilken her er lidt zigzagformig bugtet saaledes, at Knuderne altid staa i dens Udbugtninger. Disse Knuder viser paa deres lige afskaarne Ende en cirkelrund Fordybning omgiven af en

mer bears only female sexual buds, the latter only males.

The *female clusters* (gynophores Huxley) (fig. 1—4, q) have in the most developed state a length of 5 Mm. and in their outer part a width of $1^1/_2$ Mm., but they taper gradually towards their base. They consist each of a number of small grapes of an elongated pear-like or club-like form (fig. 16) which are everywhere closely congregated round a tolerably thick cylindrical hollow stem. Each of these small grapes consists of a similarly cylindrical hollow thinner branch proceeding from the stem and bearing the very closely clustered globular or slightly oval buds (fig. 17) attached round the branch by short and slender stalks. The outermost branches are always larger, and bear the most developed buds; towards the base they become gradually shorter, and their buds less developed. Each bud contains, within a thin envelope, only a single globular egg (fig. 18) with a finely granulated transparent colorless yolk, wherein the germinal vesicle and especially the germinal spot is very distinct. In the walls of the stem, as well as in those of its branches, there appear close-lying longitudinal muscular fibres by which the whole appendage can be greatly contracted.

The *male clusters* (Androphores, Huxley) (fig. 1—4 m.) are more slender than the female, but when extended are many times longer, being, as above already mentioned, formed of a stem which can be extended to a length nearly as great as that of the whole colony or more than 30 Mm., and has the appearance of a tentacular filament (fig. 1 c); but which contracts suddenly on the slightest touch, and when contracted is not longer than the female clusters. This stem (fig. 9—11 c) is simply cylindrical or filiform, unramified and hollow, exhibiting in its walls numerous close-lying longitudinal muscular fibres, and less closely-lying transverse or circular fibres. The buds or seed-capsules (fig. 13) are attached singly round the main stem by short and slender stalks; near the base of this stem they are very small and globular; further outward they become gradually larger, oval or elliptical and at last very large, up to 2 Mm. long and cylindrical with obtusely rounded extremity; their length being 5—6 times as great as their thickness, and 6—10 as great as that of the most developed female buds. Their exterior skin (calyx Huxley) is hyaline; the interior nucleus (manubrium, H.) in form similar to the outer contour, and containing the seed in its walls, is in the most developed buds light and transparent orange yellow; in the less developed, hyaline. On a sometimes greater sometimes smaller exterior part of the stem, these buds are usually wanting; and in their stead appear more or less numerous, very small short cylindrical tubercles (fig. 9—11 c, fig. 12) which, when the stem in the living state is extended, are observed (fig. 8 c) to be placed in 2 alternating rows, one on each side; the stem being here bent a little in zig-zag, so that the tubercles always stand on its convexities. These tubercles exhibit on their squarely truncated extremity a circular indentation surrounded

ringformig Vulst (Fig. 12) og frembyde saaledet Udseendet af Sugevorter, som jeg tidligere feilagtig holdt dem for. De ere imidlertid i Virkeligheden intet andet end de gjensiddende Smaastilke, ved hvilke de allerede affaldne modne Kjønsknopper vare fæstede til Hovedstilken. Denne Antagelse bestyrkes yderligere derved, at man undertiden (Fig. 11) finder Knopper eller vel udviklede Sædkapsler ganske nær ved den yderste Ende af Stilken og indenfor disse enkelte deslige Knuder, som i deres Dimensioner svare til de Smaastilke, ved hvike hine ere fæstede.

Af de beskrevne Kjønsvedhæng fandtes paa det første Exemplar 15—16 Par vel udviklede, foruden 5—6 Par meget smaa nær ved Skivens smalere Ende samt ved dens bredere Ende 4 efterhaanden mindre blivende kvindelige Klaser, under hvilke, med Undtagelse af den største, de mandlige endnu ikke vare udviklede. Man ser heraf, at disse Vedhæng ikke alene spire frem ved den smale, men ogsaa ved den brede Ende af Skiven eller Enden af Spiralen, hvor ellers de største eller ældste af de øvrige Vedhæng findes. — Gegenbaur beskriver (l. c. pag. 61) de mandlige Klaser hos P. hydrostatica som „mindre forgrenede end de kvindelige“ og tilføier, at „Knoppernes korte Stilk forbinder sig med sin Lige til en Gren, paa hvilken de ældre Knopper sidde paa Spidsen og de yngre nærmere dens Udspring. Jeg kan ikke hos mine Exemplarer af denne middelhavske Art finde nogen Forgrening af de mandlige Klaser, hvilke i alle Henseender forholde sig som hos den nordiske Art: Knopperne sidde hos begge enkeltvis rundtom den cylindriske ugrenede Stilk. Ligesaa stemme de kvindelige Klaser hos begge Arter fuldkommen overens.

Til Slutning vil jeg ikke undlade at henlede Opmærksomheden paa den i mange Henseender betydelige Lighed som synes at finde Sted mellem vor nordiske Physophora og den af Gegenbaur (Acta nat. Curios. 1859, p. 67 Tab. 32 Fig. 53—56) beskrevne *Stephanospira insignis.*

Foruden i Luftsækkens lignende Form stemme begge paafaldende overens i Formen af Skiven eller den udvidede nederste Del af Stammen, hvis laterale Indsnit hos Stephanospira er endnu dybere og bredere, hvorved Spiralen, som ogsaa her er dreiet tilhøire, bliver mere udtrukken, saa at dens bredere Ende, som bærer de ældste Vedhæng, kommer til at ligge endnu høiere oppe eller længere fjernet fra den smale Ende, hvor deres Vegetationspunkt findes, end hos vor Physophora. — Hvad de “smaa sugevortelignende“ Dannelser angaar, som Gegenbaur hos Stephanospira ansaa for Sugerør eller „polypagtige Maver“, hvilke saaledes her skulle være meget afvigende fra alle andre Physophoriders, da tror jeg mig ved de ovenfor anførte Exempler fra Physophora beføiet til at antage, at de sandsynlig ikke er andet end de knopformige Fremragninger af Skiven, der bære Sugerørene, hvilke sidste udentvivl vare affaldne paa Gegenbaurs Exemplarer.

En anden Forskjel mellem Stephanospira og Physophora tror Gegenbaur at finde deri, at hos den første “de

by an annular elevation (fig. 12) and thus present the appearance of suckers for which I previously mistook them. They are however nothing else but the remaining small stalks, by which the mature sexual buds (already fallen off) were attached to the main stem. This assumption is further corroborated by buds or well developed seed capsules (fig. 11) being sometimes found quite close to the extreme end of the stem, and in the intervals between them simple tubercles corresponding in dimensions to the small stalks by which the buds are attached..

Of the sexual appendages described there were in the largest specimen 15—16 pairs well developed, besides 5—6 pairs very small near the narrower end of the disc; and at the wider end 4 gradually smaller female clusters, beneath which, with exception of the largest, the males were not yet developed. It thus appears that these appendages issue not only from the narrow end, but also from the broad end of the disc or the end of the spiral, where the largest and the oldest of the other appendages are found. — Gegenbaur describes (l. c. p. 61) the male clusters in P. hydrostatica as “less ramified than the females“ and adds that “the short stem of the buds connects itself with its fellow to a branch on which the older buds are situated at the point, and the younger nearer to its source. I cannot in my specimens of this Mediterranean species find any ramification of the male clusters which appear to be in all respects similar to those of the northern species: the buds are in both placed separately around the cylindrical unbranched stem. Likewise the female clusters of both species correspond entirely.

In conclusion I cannot omit to draw attention to the great resemblance apparent in many respects between the northern Physophora and the *Stephanospira insignis* described by Gegenbaur (Acta Nat. Curios. 1859 p. 67 Tab. 32 fig. 53—56).

Besides the similar form of the air-chamber, both agree perfectly in the form of the disc or enlarged lower part of the axis, the lateral incision of which in the Stephanospira is still deeper and wider, whereby the spiral — also here turning to the right — becomes more drawn out; so that its broader end, bearing the oldest appendages lies still higher up or further removed from the narrower end, where their vegetation-point is, than in our Physophora. — With respect to the “small sucker-like“ formations which Gegenbaur took for suction tubes or *polyp-like stomachs* in *the Stephanospira,* and which thus would seem to be very different from those of all other Physophoridæ, I feel justified, by inference from what has been stated above relatively to the Physophora, in presuming that they are probably nothing else but the knob-like processes of the disc which bear the suction-tubes; the latter having doubtless fallen off in Gegenbaur's specimens.

Another difference between the Stephanospira and Physophora is considered by Gegenbaur to be, that in the

kvindelige Kjønsvedhæng staa indenfor de mandlige", hvorimod det omvendte Forhold skal finde Sted hos Physophora, „hvor netop hine sidde udenfor disse". Der synes heri at være en Confusion. Naar, som her, begge Slags Kjønsvedhæng sidde paa eller lige ved Randen af Skiven, vil det ofte være vanskeligt at sige, hvilke af dem, der staa udenfor eller indenfor hinanden, hvorimod det lettere lader sig bestemme, hvilke af dem der staa øverst (d. e. nærmest Coloniens øverste Ende, som bærer Luftsækken) eller nederst. Efter Gegenbaurs Fig. 53, som viser Skivens underste Side, kjendelig ved de knopformige Fremragninger, der bære Sugerørene, staa de mandlige Kjønsvedhæng tydeligt under de kvindelige. Forholdet er altsaa ogsaa i denne Henseende ganske det samme som hos begge de ommeldte Arter af Physophora, ligesom og selve Kjønsvedhængenes Bygning ligeledes er fuldkommen overensstemmende.

Paa Grund af alle disse Ligheder vilde jeg derfor uden Betænkning have henført Stephanospira insignis som en tredie Art til Slægten Physophora, naar ikke Mangelen af Følere, hvilke dog kunne have været affaldne og saaledes undgaaet Opmærksomheden, men især Forholdet af Fangtraadene stod i Veien. Disse, som ere grenede eller besatte med Sidetraade, der ende i Nesselknopper, som ganske stemme overens med samme af Physophora, skulle nemlig efter Gegenbaur (l. c. 71, Fig. 54), udspringe fra Enden af de kvindelige Kjønsvedhængs Stamme. En saadan Forbindelse af de egentlige Fangtraade (accessoriske simple Fangtraade uden Nesselknopper forekommer som bekjendt ved Roden af Følerne hos Physophora) med Kjønsvedhængene er hidtil uden Exempel blandt Physophoriderne ja blandt alle Siphonophorer, hvor de altid udspringe fra Roden af Sugerørene. Der tør derfor endnu være Tvivl om Rigtigheden af dette mærkværdige afvigende Forhold, som kun er iagttaget paa et Spiritusexemplar, hvor en Skuffelse let kan finde Sted, indtil det ved en fornyet Undersøgelse, især af levende Exemplarer, bliver stadfæstet eller modsagt, i hvilket sidste Tilfælde Slægten Stephanospira maatte forsvinde af Systemet og dens eneste Art blive at henføre til Slægten Physophora.

Efter de ovenanførte Iagttagelser kan den norske Art diagnoseres saaledes:

Physophora borealis M. Sars.

Camera aërifera majuscula, obpyriformis seu inferne latior, superne acuminata, striis (septis) longitudinalibus æqvidistantibus (in specimine observato 9), vertice purpureo. Campanulæ natatoriæ minus distincte distichæ aut potius subspiraliter dispositæ. Axis (stipes communis) superne filiformis, inferne in vesicam dilatatus magnam depressiusculam, incisura laterali rotundata subreniformem, spiram distinctam dextrorsum tortam formantem. Peripheria spiræ superne obsita brachiis biserialibus alternantibus, ad basin filo tentaculari simplice munitis, inferne tubulis suctoriis

first "the female appendages are situated to the inside of the males while, the contrary is the case in the Physophora where they are placed outside." There seems here to be a confusion. When, as in this case, both sorts of sexual appendages are situated on, or close to the margin of the disc, it will often be difficult to say which are outside and which are inside of the others; while on the contrary it is more easy to determine which of them stand highest (i. e. nearest to the upper extremity of the colony which bears the air-chamber) or lowest. According to Gegenbaur's fig. 53 which shews the under side of the disc distinguishable by the bud-like prominences which bear the suction-tubes, the male sexual appendages are evidently placed under the females. The case is therefore in this respect quite the same in both the species of Physophora mentioned; and the structure of the sexual appendages is likewise perfectly similar.

On account of all these similarities I should therefore without hesitation have classed the Stephanospira insignis as a third species of the genus Physophora, if the absence of feelers — which might however have fallen off and thus escaped observation — and especially the insertion of the tentacular filaments did not form an obstacle to such classification. The tentacular filaments, which are branched or have lateral threads terminating in urticary knobs quite similar to those of the Physophora, are said according to Gegenbaur (l. c. p. 71 fig. 54) to issue from the extremity of the stem of the sexual appendages. No such connexion of the proper tentacular filaments (accessory simple tentacular filaments without urticary knobs occur as is well known at the root of the feelers in the Physophora) with the sexual appendages has hitherto been noticed in any of the Physophoridæ, nor even among all the Siphonophores, where they always issue from the root of the suction-tubes. There may therefore still be some doubt as to the reality of this very remarkable divergence — which has only been observed in a spirit specimen where a mistake might easily occur. — until, the assumption be confirmed or contradicted by repeated observations especially of living specimens; in the latter case the genus Stephanospira must disappear from the system, and its only species must be classed under the genus Physophora.

According to the foregoing observations, our Norwegian species may be thus diagnosticated:

Physophora borealis. M. Sars.

Camera aërifera majuscula obpyriformis seu inferne latior superne acuminata striis (septis) longutudinalibus æquidistantibus (in specimine observato 9) vertice purpureo. Campanulæ natatoriæ minus distincte distichæ aut potius subspiraliter dispositæ. Axis (stipes communis) superne filiformis inferne in vesicam dilatatus magnam depressiusculam incisura laterali rotundata subreniformem, spiram distinctam dextrorsum tortam formantem. Peripheria spiræ superne obsita brachiis biserialibus alternantibus, ad basin filo tentaculari simplice munitis, inferne tubulis suctoriis

uniseriatis, ad basin tentaculo præditis longisimo ramulis clavatis, clava (pallio) oblonga apice obtuse rotundato lobisqve lateralibus nullis, filum in spiras 4—5 contortum includente. In intervallo brachia a tubulis suctoriis separante adsunt appendices genitales biseriatæ, approximatæ (seu binæ qvasi e basi communi orientes) superiores femineæ, ramosæ uviformes, capsulis parvis globosis seu ovatis, inferiores masculæ, filiformes, capsulis majoribus ellipticis aut subcylindricis obsitæ. Punctum vegetationis omnium harum appendicum, segmenta qvodammodo sed maxime approximata formantium inferne ad incisuram lateralem collocatum. Longitudo totius coloniæ (axis) sine appendicibus 38 Mm.

Habitat ad Bodö Norvegiæ, latit. bor. 67° 15'.

SENERE TILLÆG.

Efterat Tab. 3 allerede forlængst var stukken og den ovenfor meddelte Beskrivelse udarbeidet, blev 3 skjønne Exemplarer af denne Art fundne af min Søn i Begyndelsen og Midten af Juni 1866 ved Fiskeværet Skraaven i Lofoten. Af disse fuldkommen hele og uskadte Exemplarer viste det sig nu, at de af mig ved Bodø iagttagne have været baade ganske unge og i flere Henseender ufuldstændige. Coloniens Axe eller Stammen af det største Exemplar (Tab. 4 Fig. 1) har i Spiritus, altsaa i stærkt contraheret Tilsand den anselige Længde af 60 Mm., altsaa næsten dobbelt saa stor som det største af de 2 af mig iagttagne Exemplarer. Svømmeklokkerne vare paa dette Exemplar foruden de smaa uudviklede lige under Luftkammeret 11 i Tallet, eller ligesaa mange som hos de største af de af Vogt i Middelhavet observerede Exemplarer af P. hydrostatica, og ordnede paa samme Maade som hos denne Art i 2 opposite Rader, 6 i den ene og 5 i den anden. Deres Form (Fig. 3, 4) stemmer temmelig nøie overens med samme af P. hydrostatica, saaledes som de af Claus (*l. c.*) ere blevne beskrevne og afbildede; idet Kappen fortil gaar ud i 2 triangulære under Klokkens Aabning fremskydende Lapper, hvilke ikde observeredes paa de af mig tidligere iagttagne Exemplarer. Luftkammeret var paa dette Exemplar af en lignende omvendt pæredannet Form som paa hine; paa et af de mindre Exemplarer var det derimod (Fig. 2) smalere og mere langstrakt, næsten af cylindrisk Form, men viste hos alle Exemplarer meget tydeligt den ovenomtalte eiendommelige longitudinale Stribning. Selve Axens Form, saavel dens øvre traaddannede Del som den nedre udvidede Del (Skiven), stemmende paa alle 3 Exemplarer fuldkommen overens med mine Exemplarer fra Bodø. De talrige cylindriske rundtom Skiven tæt sammen fæstede Følere (Fig. 1, f. f.), der paa det levende Dyr bevægede sig paa forskjellig Vis, strækkende og bøiende sig i alle Retninger, vare paa det største Exemplar 40 Mm. lange i contraheret Tilstand og hos det levende Dyr omtrent af samme Længde som den traaddannede Del af Axen. De vare paa dette Exemplar af en livlig minierød Farve, imod Spidsen noget lysere, hos de 2

uniseriatis ad basin tentaculo præditis longissimo ramulis clavatis clava (pallio) oblonga apice obtuse rotundato lobisque lateralibus nullis, filum in spiras 4—5 contortum includente. In intervallo brachia a tubulis suctoriis separante adsunt appendices genitales biseriatæ approximatæ (seu binæ quasi e basi communi orientes) superiores femineæ ramosæ uviformes capsulis parvis globosis seu ovatis inferiores masculæ filiformes capsulis majoribus ellipticis aut subcylindricis obsitæ. Punctum vegetationis omnium harum appendicum, segmenta quodammodo sed maxime approximata formantium, inferne ad incisuram lateralem collocatum. Longitudo totius coloniæ (axis) sine appendicibus 38 Mm.

Habitat ad Bodö Norvegiæ latit. bor. 67° 15'.

LATER ADDITION.

A long time after Tab. 3 was engraved and the above description elaborated, 3 fine specimens of this species were found by my Son in the beginning and in the middle of June 1866 at the fishing place Skraaven in Lofoten. From these perfectly entire and uninjured specimens it appeared that those which I had examined at Bodö were both quite young, and in many respects imperfect. The axis of the colony or the stem of the largest specimen (Tab. 4 fig. 1) has — preserved in spirit and therefore in a strongly contracted state — a length of 60 Mm. that is nearly double the length of the larger of the 2 specimens observed by me. The swimming bells in this specimen, not counting the small undeveloped ones close under the air-chamber, were 11 in number, or just as many as in the largest specimen of P. hydrostatica observed by Vogt in the Mediterranean, and arranged in the same manner as in this species in 2 opposite rows, 6 in the one and 5 in the other. Their form (fig. 3, 4) agrees rather accurately with that of the swimming bells in P. hydrostatica as described and delineated by Claus *(l. c.)*; the mantle terminating in front in 2 triangular lobes projecting under the opening of the bell; which 2 lobes were not noticed in the specimens previously examimed by me. The air chamber was in this specimen of an inverted pear-like form as in those previously observed; but in one of the smaller specimens (fig. 2) it was narrower, more elongated and nearly cylindrical. In all the specimens however it exhibited very distinctly the before mentioned peculiar longitudinal striping. The form of the axis itself, its upper filamentary parts as well as the lower enlarged part (the disc) agreed completely in all 3 specimens with my specimens from Bodö. The numerous cylindrical feelers (fig. 1 f. f.) attached closely together round about the disc, which feelers in the living animal moved themselves in various manners, stretching and curving themselves in all directions, were in the largest specimen 40 Mm. long in the contracted state, and in the living animal about of the same length as the filiform part of the axis. They were in this specimen of a lively minium-red color, somewhat lighter towards the point; but in the two smaller speci-

mindre Exemplarer derimod meget bleg orangegulagtige. De ved Roden af disse Følere fæstede accessoriske Fangtraade (*f' f'*) vare hos det levende Dyr meget stærkt forlængede, naaede næsten til Enden af Følerne og bøiede sig paa forskjellig Vis ofte i flere Spiraler. Sugerørene (*aaa*) og Generationsklaserne viste ialmindelighed den ovenfor udførligt beskrevne Form og Bygning og vare paa det levende Dyr af en lys gulagtig Farve. Derimod viste de egentlige Fangtraade (*tt*) sig langt mere udviklede end paa mine Exemplarer fra Bodø og vare tilstede i et meget betydeligt Antal. Paa det levende Dyr frembøde disse Fangtraade et uforligneligt Syn ved sit stadigt vexlende Spil, idet de afvexlende og med stor Hurtighed paa forskjellig Vis forkortede sig og igjen strakte sig ud, hvorved de kunde opnaa en Længde mere end 3 Gange saa stor som hele Coloniens Axe. Nesselknopperne, der i stor Mængde vare med korte Mellemrum fæstede langs hele Fangtraaden til temmelig korte og tynde Sidegrene (Fig. 5), viste hos alle 3 Exemplarer paa den inderste Del den af mig ovenfor beskrevne Form og Bygning, idet de største af dem ere elliptiske med but tilrundet Spids og indslutte en i 4 eller 5 skrueformige Spiraler eller Vendinger dreiet Streng (det saakaldte Nesselbaand). Længere ud paa samme findes der Nesselknopper, der vel ere noget mere langstrakte, men dog vise en meget lignende elliptisk Form, og i hvilke Nesselbaandet beskriver 6 eller 7 Vendinger (Fig. 6). Paa hele den øvrige eller ydre Del af Fangtraadene have derimod Nesselknopperne en meget forskjellig Form, der mere stemmer overens med samme hos de middelhavske Arter P. hydrostatica og P. Philippii. De er her nemlig (Fig. 5, u, Fig. 7) af omvendt pæredannet Form, tykkest ved Basis og efterhaanden afsmalnende mod Enden, der gaar ud i en tynd med smaa tilspidsede Fortsatser besat Spids. Den indsluttede Nesselstreng er ikke længere oprullet i de regelmæssige spiraldreiede Vendinger som paa de yngre Nesselknopper, men ligger nu uordentlig sammenslynget i flere uregelmæssige Bugter. Den indre Hule (Fig. 7, b^1 b^1) paa disse Nesselknopper indtager ogsaa et meget mindre Rum end paa de mindre udviklede, hvorimod den ydre Kapsel (*b*), der nu synes at bestaa af flere Lag, har betydelig tiltaget i Tykkelse. Kun paa et Punct nær ved Basis, hvor den ene Ende af Nesselstrengen fæster sig til Kapselens Væg, og hvorigjennem Næsselstrengen rimeligvis tilsidst finder sin Udvei, har Kapselen bibeholdt sin oprindelige Tyndhed; der synes her endog at være en liden Aabning i Kapselens Væg, antydet ved en mørkere Plet (*d*). Sprænges Kapselelen paa en af disse Nesselknopper, retter Nesselstrengen sig ved sin Elasticitet strax mere eller mindre fuldstændigt ud (Fig. 8), og de 2 muskuløse Baand (*yy*), der forbinde begge Ender af samme og som i Begyndelsen ligesom Nesselsrengen selv har været spiraldreiet følgende nøiagtig dennes forskjellige Vendinger, træde nu tydeligt ud fra samme. Paa den Ende af Nesselstrengen, der forbinder sig med Kapselens Væg, ere begge disse Strenge fæstede tæt sammen til dennes yderste Spids, medens de paa den modsatte med de store elliptiske Nesselceller for-

mens very pale orange-yellowish. The accessory filament attached at the root of these feelers (f^1 f^1) were in the living animal very strongly elongated, reaching nearly to the end of the feelers, and were twisted in various manners, often in several spirals. The suction-tubes (*aaa*) and the generative clusters exhibited generally the above minutely described form and structure, and were in the living animal of a light yellowish color. But the proper tentacles (*tt*) appeared far more developed than in my specimens from Bodö, and were present in very considerable numbers. In the living animal these tentacles presented a very beautiful spectacle by their continually varying play; alternately and with the greatest rapidity shortening themselves and in various manners stretching themselves out again, whereby they could attain a length more than 3 times as great as that of the whole colony. The urticary knobs, which in great numbers and at small intervals were fixed all along the tentacle to rather short and thin lateral branches (fig. 5), exhibited in all 3 specimens on the interior part the form and structure above described by me; the largest of them being elliptical with an obtusely rounded point, and containing a chord (the so-called urticary band) twisted in 4 or 5 screw-like spirals or coils. Further out on the tentacles there are urticary knobs which are indeed somewhat more elongated, but yet shew a very similar elliptical form; and in these the urticary band describes 6 or 7 turns (fig. 6). On the whole remaining or exterior part of the tentacles the urticary knobs have on the contrary a very different form, which more agrees with that observed in the Mediterranean species P. hydrostatica and P. Philippii. They are here (fig. 5 u. fig. 7) inversely pear-shaped, thickest at the base, and gradually tapering to the extremity, which terminates in a thin point covered with small pointed processes. The enclosed urticary chord is no longer twisted in regular spiral coils, as in the younger urticary knobs; but now lies loosely convolved in many irregular bends. The interior cavity (fig. 7 b^1 b^1) in these urticary knobs occupies also a much smaller space than in those less developed, while on the contrary the exterior capsule (*b*) which now seems to consist of several layers, has become considerably thicker. Only in one point near to the base, where one end of the urticary chord is attached to the wall of the capsule, and through which the urticary chord probably finds at last its exit, the capsule retains its original thinness; there seems at this point to be even a small opening in the wall of the capsule, indicated by a darker spot (*d*). If the capsule of one of these urticary knobs is ruptured, the urticary chord straightens itself immediately by its own elasticity more or less completely (fig. 8) and the two muscular bands (*yy*) which connect both ends of it and which at first, like the urticary chord itself, were spirally twisted, following exactly its various windings, stand out from it in distinct relief. At the end of the urticary chord that is connected with the wall of the capsule both these bands are attached, close together, to its extreme point, while at the opposite end, where are the large el-

synede Ende forbinde sig med Nesselstrengen i ulige Høide, idet den ene fæster sig til Spidsen, den anden et godt Stykke ovenfor samme. Langs den ene Kant af Nesselstrengen bemærkes nu ogsaa tydeligt en tynd gjennemsigtig Bræm (*x*), der ligeledes synes at være af elastisk Natur og ligesom de 2 muskuløse Baand at bidrage til at forøge den stærkt spendte Tilstand, hvori hele Nesselstrengen befinder sig, medens den er indsluttet i Kapelen. Disse ydre fuldt udviklede Nesselknopper vare paa det levende Dyr næsten ganske farveløse og hyaline, kun med den yderste tilspidsede Ende svagt gulagtigt pigmenteret. Selve Fangtraaden (Fig. 5, t. t.), der var af en svag rosenrød Farve, viste meget tydeligt den af Claus omtalte eiendommelige ligesom leddede Form, idet den med bestemte Mellemrum havde tydelige cirkulære Indsnøringer. Dens ydre Overflade viste en uregelmæssig rynket Epithelialschicht fyldt med smaa stærkt lysbrydende Celler (begyndende Nesselceller), som ogsaa strakte sig et Stykke ud paa de i Nesselknopperne endende korte Sidegrene (Fig. 7, a).

FORKLARING AF FIGURERNE.

Tab. 5, Fig. 1 forestiller det største af de 2 ved Bodø fundne Exemplarer af Physophora borealis noget forstørret, tegnet efter det levende Dyr. *a* det største af de 2 igjensiddende Sugerør; *cc* de mandlige Klasers forlængede traaddannede Stilk i fuldt udstrakt Tilstand; *mm* de ved Basis af denne Stilk fæstede mandlige Gemmer; *qq* de kvindelige Klaser; *p* Luftkammeret.

Fig. 2. Det samme Exemplar i kontraheret Tilstand seet ovenfra, noget stærkere forstørret. *f'f'* de accessoriske fra Basis af Følerne udgaaende Fangtraade; *kk* den langs Stammens traadformige Del gaaende foldede eller krusede Længdekant, hvortil Svømmeklokkerne ere fæstede; de øvrige Bogstaver som paa Fig. 1.

Fig. 3. Samme seet nedenfra. *bb* de koniske Knuder, hvortil de affaldne Sugerør have været fæstede; de øvrige Bogstaver som paa Fig. 1 og 2.

Fig. 4. Samme seet fra den Side, hvor Skivens Indsnit befinder sig. Bogstaverne som paa Fig. 2.

Fig. 5. Et Stykke af Skivens ydre Rand med de hertil fæstede Vedhæng ovenfra, *b* Knude, hvortil et Sugerør har været fæstet; *ff* Følerr; *f'f'* accessoriske fra disses Basis udgaaende Fangtraade; *q* kvindelige Klaser; *mm* mandlige Klaser.

Fig. 6. Et Stykke af Randen fra Siden stærkere forstørret, visende Mærkerne efrer de i 2 alternerende Rader fæstede Følere; *b* og *q* som paa foregaaende Figur.

Fig. 7. 2 af de koniske Knuder, hvortil Sugerørene have været fæstede, i mere ellcr mindre udstrakt Tilstand.

Fig. 8. Et Stykke af en af de mandlige Klaser i udstrakt Tilstand. *c* den traadformige Stamme; *m* Gemmer.

Fig. 8. En hel mandlig Klase i kontraheret Tiistand. *c* den traadformige Ende af Stammen med Mærker efter de affaldne Gemmer; *mm* udviklede Gemmer.

Fig. 10. Enden af en saadan mandlig Klase. *c—m* som paa foregaaende Figur.

Fig. 11. Enden af en anden mandlig Klase, paa hvilken der findes Gemmer næsten lige til Enden af Stilken. *m'* den hyaline gjensiddende Hud af Gemmer, hvoraf Indholdet er udtømt.

Fig. 12. Enden af en mandlig Gemmestamme, 60 Gange forstørret, for at vise de med en cirkelformig Fordybning forsynede Knuder, hvortil de modne Gemmer have været fæstede.

liptical urticary cells, the muscular bands are attached to the urticary chord at different heights; one being fixed at the point, and the other some distance above it. Along one side of the urticary chord there is now plainly discernible a transparent rim (*x*) which also appears to be of an elastic nature, and, like the two muscular bands, to contribute to the tension of the whole urticary chord during its confinement within the capsule. The exterior fully developed urticary knobs were in the living animal almost entirely colorless and hyaline, having only their outer pointed extremities slightly tinted with yellow. The tentacle itself (fig. 5 t. t.), which was of a pale rosy red color, shewed very plainly the apparently articulated form noticed by Claus, having evident circular instrictions at regular intervals. Its outer surface shewed an irregular corrugated epithelial stratum full of small strongly refracting cells (incipient thread-cells) which also extended some distance out on the short lateral branches (fig. 7 a) that terminate in the urticary knobs.

EXPLANATION OF THE FIGURES.

Tab. 5, fig. 1 represents the larger of the 2 specimens of Physophora borealis found at Bodö somewhat magnified, drawn from the living animal; *a,* the larger of the 2 remaining suction-tubes; *cc,* the elongated filiform stem of the male clusters in a fully extended state; *m m,* the male germs attached to the base of this stem; *qq,* the female clusters; *p,* the air-chamber.

Fig. 2. The same specimen in a contracted state seen from above, somewhat more magnified; f^1 f^1, the accessory filaments issuing from the base of the feelers; *kk,* the longitudinal folded or corrugated border running along the filiform part of the axis, and bearing the swimming bells; the other letters as in fig. 1.

Fig. 3. The same seen from below. *bb,* the conical tubercles to which the fallen off suction-tubes have been attached; the other letters as in fig. 1 and 2.

Fig. 4. The same seen from the side where is the incision of the disc; the letters as in fig. 2.

Fig. 5. A portion of the outer border of the disc with the appendages attached, viewed from above. *b,* a tubercle to which a suction tube had been attached; *ff,* feelers; f^1 f^1, accessory filaments issuing from the base of the feelers; *q,* female clusters; *mm,* male clusters.

Fig. 6. A portion of the border from the side more strongely magnified, shewing the traces of the feelers fixed in 2 alternating rows; *b* and *q,* as in the foregoing figure.

Fig. 7. 2 of the conical tubercles to which suction tubes had been attached, in a more or less extended state.

Fig. 8. A portion of one of the male clusters in an extended state; *c,* the filiform stem; *m,* capsules.

Fig. 9. An entire male cluster in a contracted state. *c,* the filiform end of the stem with traces of the fallen capsules; *mm,* developed capsules.

Fig 10. The extremity of a similar male cluster. *c—m,* as in the foregoing figure.

Fig. 11. The extremity of another male cluster, on which are found capsules nearly to the very end of the stem. *m* the remaining hyaline skin of the capsules which have been emptied of their contents.

Fig. 12. The extremity of a male reproductive stem, magnified 60 times, shewing the tubercles with the circular indentation where the mature capsules have been attached.

Fig. 13. 2 ulige udviklede mandlige Gemmer stærkt forstørrede.
Fig. 13¹. En fuldt udviklet cylindrisk Gemme svagere forstørret.
Fig. 14. Et Par af Kjønsvedhængene i sin naturlige indbyrdes Stilling til hinanden. *m* den mandlige; *q* den kvindelige Klase.
Fig. 15. En kvindelig Klase isoleret.
Fig. 16. Et Stykke af den fælles Stamme af en kvindelig Klase med sine Sidegrene, visende tilhøire mere udviklede, tilvenstre mindre udviklede Gemmer.
Fig. 17. En af Endegrenene af en kvindelig Klase, med de mest udviklede Gemmer, 60 Gange forstørret.
Fig. 18. Et Æg udtaget af en af Gemmerne, meget stærkt forstørret.
Fig. 19. En Svømmeklokke seet ovenfra.
Fig. 20. En Føler med den ved Basis fæstede accessoriske Fangtraad (f^1).
Fig. 21. Enden af en Føler, 30 Gange forstørret, visende de her sammenhobede Nesselceller, hvoraf den lange Nesseltraad er udtraadt.
Fig. 22. Basis af en saadan Nesseltraad, 490 Gange forstørret, visende det eiendommelige med Pigger og Børster besatte Skaft.
Fig. 23. Det mindre af de 2 ved Bodø fundne Exemplarer, seet fra Siden, forstørret. *aaa* Sugerør; *k* den langs Stammens traadformige Del løbende Længdebræm, hvortil Svømmeklokkerne ere fæstede; *p* Luftkammeret; *tt* de med talrige Nesselknopper forsynede egentlige Fangtraade.
Fig. 24. Et af Sugerørene tilligemed den fra Basis af samme udspringende Fangtraad; *b* Sugerørets Basaldel; *m* dets midterste Del eller Maven; *s* dets yderste Del eller Snabelen; *t* Fangtraaden.
Fig. 25. En af de allerinderste til Fangtraaden fæstede Sidegrene, paa hvilken endnu ikke Nesselknoppen er anlagt, 60 Gange forstørret.
Fig. 26. En anden Sidegren, der har delt sig i 2 Afsnit.
Fig. 27. En tredie, hvor allerede de 3 Afsnit ere tydelige; *a* Stilken; *b* den midterste opsvulmede Del (Nesselknoppen), paa hvilken der allerede har dannet sig en ydre Kapsel; *c* Endetraaden.
Fig. 28. En fjerde, paa hvilken det midterste af Kapselen omhyllede Parti af Strengen allerede viser et Par langt udtrukne Skruevendinger.
Fig. 29. En femte, paa hvilken det midterste Parti (den egentlige Nesselknop) har betydeligt tiltaget i Volum og den indsluttede Strengs Skruevendinger ere blevne tættere; de store gule Nesselceller ere ligesom paa de 2 foregaaende Figurer tydelige ved den øverste Del af Strengen.
Fig. 30. En sjette, paa hvilken Nesselstrengen allerede beskriver 4 Spiralvendinger; Endetraaden har begyndt at forkorte sig.
Fig. 31. En betydelig større Nesselknop, paa hvilken Kapselen har tiltaget betydeligt i Størrelse og Nesselstrengen forøget sine Spiralvendinger med en ny; af Endetraaden rager endnu kun en liden 3lappet Del (*c*) udenfor Kapselen.
Fig. 31'. Det 3lappede Endevedhæng seet fra den brede Side.
Fig. 32. En Nesselknop, paa hvilken Endetraaden ganske er inddraget i Kapselen, 85 Gange forstørret. Den hele Nesselstreng har nu forandret sin Stilling, saa at de store Nesselceller komme til at ligge ved den ydre Ende af Nesselkapselen.
Fig. 33. En af de største Nesselknopper paa dette Individ, 85 Gange forstørret.
Fig. 34. 2 af de store Nesselceller isolerede, 270 Gange forstørrede.

Fig. 13. 2 unequally developed male capsules, strongly magnified.
Fig. 13¹. A fully developed cylindrical capsule, less magnified.
Fig. 14. A pair of sexual appendages in their natural relative position. *m*, the male; *q*, the female cluster.
Fig. 15. A female cluster isolated.
Fig. 16. A portion of the common stem of a female cluster with its side branches, shewing on the right more developed capsules, and on the left those less developed.
Fig. 17. One of the terminal branches of a female cluster, with the most developed capsules, magnified 60 times.
Fig. 18. An egg taken out of one of the capsules, strongly magnified.
Fig. 19. A swimming bell seen from above.
Fig. 20. A feeler with the accessory filaments (f^1) attached to its base.
Fig. 21. The extremity of a feeler, magnified 30 times, shewing the accumulated thread-cells from which the long urticary filament is extended.
Fig. 22. The base of such an urticary filament, magnified 490 times, shewing the peculiar shaft covered with spikes or bristles.
Fig. 23. The smaller of the 2 specimens found at Bodø viewed from one side, magnified. *aaa*, suction tubes; *k*, the longitudinal rim running along the filiform part of the axis, and bearing the swimming bells; *p*, the air-chamber; *tt*, the proper tentacular filaments covered with numerous urticary knobs.
Fig. 24. One of the suction tubes together with the tentacle issuing from its base. *b*, the basal part of the suction tube; *m*, its central part or stomach; *s*, its exterior part or proboscis; *t*, the tentacle.
Fig. 25. One of the innermost lateral branches of the tentacle, whereon the urticary knob is not yet formed, magnified 60 times.
Fig. 26. Another lateral branch which has divided itself into 2 sections.
Fig. 27. A third where the 3 sections are already perceptible. *a*, the stem; *b*, the central enlarged part (the urticary knob) on which an exterior capsule has already formed itself; *e*, the terminal filament.
Fig. 28. A fourth, in which the central part of the chord enveloped in the capsule exibits already a few long drawn spiral coils.
Fig 29. A fifth, in which the central part (the proper urticary knob) has increased considerably in size. and the coils of the enclosed chord have become closer; the large yellow thread-cells are as in the 2 foregoing figures, discerned at the upper extremity of the chord.
Fig. 30. A sixth, in which the urticary chord already describes 4 spiral turns; the terminal filament has begun to get shorter.
Fig. 31. A much larger urticary knob, in which the capsule has considerably increased in size, and the urticary filament has added a new coil to its spiral; there is still only a small 3-lobed part *(c)* of the terminal filament projecting outside of the capsule.
Fig. 31'. The 3-lobed appendage seen from the broad side.
Fig. 32. An urticary knob, of which the terminal filament is quite drawn into the capsule, magnified 85 times. The whole urticary chord has now changed its position; so that the large thread-cells lie at the outer end of the urticary capsule.
Fig. 33. One of the largest urticary knobs on the same individual, magnified 85 times.
Fig. 34. 2 of the large thread-cells isolated, magnified 270 times.

Fig. 35. Mindre Nesselceller fra Nesselstrengen, 490 Gange forstørrede.

Tab. 6, Fig. 1 forestiller det største af de 3 ved Lofoten tagne Exemplarer af Physophora borealis i naturlig Størrelse, tegnet efter det levende Dyr; *aaa* Sugerørene; *fff* Følerne; *f'f'f'* de accessoriske Fangtraade; *m* de mandlige Klaser; *tt* Fangtraadene.

Fig. 2. Luftkammeret af et af de mindre Exemplarer, forstørret.

Fig. 3. En Svømmeklokke af det største Exemplar forstørret, seet ovenfra.

Fig. 4. Samme nedenfra.

Fig. 5. Et Stykke af en af Fangtraadenes ydre Del med de paasiddende Nesselknopper. *tt* Fangtraaden med sin ydre rynkede Epithelialschicht; *u* fuldt udviklede Nesselknopper.

Fig. 6. En ikke fuldt udviklet Nesselknop, hvori Nesselstrengen beskriver 7 fuldstændige Spiralvendinger. *a* Stilken; *bb* den ydre Kapsel.

Fig. 7. En fuldt udviklet Nesselknop tilligemed Stilken, hvormed den er fæstet til Fangtraaden, stærkt forstørret. *a* Stilkens inderste Del, paa hvilken Fangtraadenc Epithelialschicht fortsætter sig; *a'* den ydre glatte Def af Stilken: *bb* Nesselknoppens ydre Kapsel; *b'b'* dens indre Hule med den uordentlig sammenslyngede Nesselstreng.

Fig. 8. Nesselstrengen udtagen af Kapselen tilligemed dens tilhørende Dele. *vv* Nesselstrengen; *x* det elastiske langs dennes ene Kant løbende Baand; *yy* de 2 Muskelbaand.

Fig. 35. Smaller thread-cells from the urticary chord, magnified 490 times.

Tab. 6, fig. 1 represents the largest of the 3 specimens of the Physophora borealis taken at Lofoten, natural size, drawn after the living animal. *aaa*, the suction tubes; *fff*, the feelers; *f'f'f'*, the accessory filaments; *m*, the male clusters; *tt*, the tentacles.

Fig. 2. The air chamber of one of the smaller specimens, magnified.

Fig. 3. A swimming bell from the largest specimen, magnified, seen from above.

Fig. 4. same, seen from below.

Fig. 5. A portion of the exterior part of one of the tentacles with the urticary knobs attached. *tt*, the tentacle with its exterior corrugated epithelial stratum; *u*, fully developed urticary knobs.

Fig. 6. A not quite fully developed urticary knob, in which the urticary chord describes 7 complete spiral coils. *a*, the stem; *bb*, the exterior capsule.

Fig. 7. A fully developed urticary knob, together with the stem by which it is attached to the tentacle, strongly magnified. *a*, the interior part of the stem on which the epithelial stratum of the tentacle is continued; *a'*, the exterior smooth part of the stem; *bb*, the exterior capsule of the urticary knob; *b'b'*, its interior cavity with the irregularly convolved urticary chord.

Fig. 8. The urticary chord taken out of the capsule with its appertenances. *vv*, the urticary chord; *x*, the elastic band running along one side of it; *yy*, the 2 muscular bands.

NYE ECHINODERMER,

BESKREVNE AF

M. SARS.

A. OM TO NYE HOLOTHURIDER.

OLIGOTROCHUS VITREUS M. SARS, NOV. GEN. & SPEC.

(Tab. 7, Fig. 1.)

Oligotrochus vitreus, M. Sars, Om arctiske Dyreformer i Christianiafjorden. Vid. Selsk. Forh. f. 1865, p. 200.

Denne nye lunge- og fodløse Holothuride har ved en flygtig Betragtning nogen Lighed med vor almindelige Synapta inhærens (Holothuria) O. F. Müller, som dog altid forekommer paa meget ringere Dyb (fra Lavvandsmærket indtil 20 Favne), medens den første er en Dybvandsform. Kroppen er ikke ormformig eller paafaldende smal i Forhold til dens Længde, som hos den nævnte Synapta (hvor den er 10—15 Gange længere end tyk), men aflang, temmelig kort og tyk (kun omtrent 4 Gange længere end tyk). Den er ogsaa langtfra saa blød, men tvertimod temmelig stiv, meget lidet foranderlig i Form, idet den kun bøies svagt, og et eller andet Sted yderst langsomt indsnøres eller udvides. Dens Bevægelser ere overordentlig træge og langsomme; man bemærker aldrig de hos Synapta inhærens saa paafaldende „Undulationer, hvilke, udgaaende fra en af dens Ender og forlængende sig snart bagfra fortil og snart i omvendt Retning, uden Ophør gjennemløbe Kroppen, som saaledes frembyder afvexlende Udvidninger og Indsnøringer med transverselle Folder“ (Quatrefages om Synapta Duvernæ, Annales des sciences naturelles 1842 Vol. 17, p. 23). Ogsaa Tentaklerne bevæge sig yderst langsomt, idet heller ikke, som hos Synapta og Chirodota, de 6 af dem skiftevis udstrækkes og bøies tilbage imod Munden. Endvidere er Kroppen krystalklar (hvoraf Artsnavnet), idet den oftest er ganske farveløs og navnlig fattes de talrige, tætstaaende, smaa brunrøde Prikker, hvilke give Synapta inhærens dens blegt brunlige eller gulrøde Farve. Endelig er Kroppens Hud ganske glat og mangler de for Synapta saa charakteristiske mikroskopiske ankerdannede Kroge, hvorfor den heller ikke, som denne, hænger fast ved Fingrene eller andre fremmede Legemer, med hvilke den kommer i Berørelse. — Undersøgelsen af Dyrets indre Bygning viser ogsaa i flere Henseender betydelig Forskjel fra Synapta, men derimod større Overenstemmelse med Chirodota, og fornemmelig med Myriotrochus.

NEW ECHINODERMS

DESCRIBED BY

M. SARS.

A. OF TWO NEW HOLOTHURIDÆ.

OLIGOTROCHUS VITREUS M. SARS, NOV. GEN. & SPEC.

(Tab. 7. Fig. 1.)

Oligotrochus vitreus, M. Sars, Om arctiske Dyreformer i Christianiafjorden. Vid. Selsk. Forh. f. 1865, p. 200.

This new lung-less and foot-less Holothuride appears at first sight to resemble our Synapta inhærens (Holothuria) O. F. Müller, which however always occurs at a much smaller depth (from low-water mark to 20 fathoms) while the O. vitreus is a deep-water animal. The body is not vermiform nor remarkably thin in proportion to its length, as in the Synapta mentioned (where it is 10—15 times as long as it is thick) but oblong, rather short and thick (only about 4 times as long as it is thick). It is also far from being so soft, but on the contrary it is rather stiff and susceptible of only slight change in form by bending itself a little, or by here and there becoming very slowly contracted or enlarged. Its movements are extremely sluggish and slow; never exhibiting those “undulations” — so remarkable in the Synapta inhærens — “which, proceeding “from the extremity and extending sometimes from the “posterior to the anterior end, and sometimes in the con“trary direction, unceasingly permeate the body and cause “it to appear alternately enlarged and contracted with “transversal folds“ (Quatrefages on Synapta Duvernæ, Annales des sciences naturelles 1842, Vol. 17, p. 23). Also the tentacles move extremely slowly, nor are 6 of them, as in the Synapta and Chirodata, alternately extended and recurved towards the mouth. Moreover the body is transparent like crystal (whence the specific name), being most frequently quite colorless, and specially without the numerous closely-placed small brownish red dots, which give to the Synapta inhærens its pale brownish or yellowish red color. Finally the skin of the body is quite smooth and destitute of the microscopic anchor-shaped hooks so characteristic of the Synapta, for which reason it does not like the Synapta adhere to the finger or to any other extraneous substances with which it comes in contact. The examination of the interior structure of the animal shews also a considerable difference in many respects from the Synapta, but on the other hand a greater conformity with the Chirodata and especially with the Myriotrochus.

Kroppen (Fig. 1 og 2) er hos middelstore Individer af vort Dyr 30—35 Mm. lang (i Spiritus skrumper den ind til omtrent Halvdelen af dens Størrelse i levende Tilstand), cylindrisk eller noget tendannet, idet den er tykkest, omtrent 8 Mm., ved Midten af dens Længde, og afsmalnes lidt imod dens forreste og endnu noget mere imod dens bagerste Ende (hos det største fundne Exemplar er Kroppen 50 Mm. lang og over Midten 12—13 Mm. tyk). Den er tillige (cfr. Fig. 1) i dens hele Længde noget bøiet, idet Rygsiden, som er bestemt ved de der beliggende Generationsorganer og det forreste Mesenterium, er mere convex eller udbuget og Bugsiden noget indhulet. Forresten antager Kroppen forskjellige Former ved den større eller mindre Grad af Contraction i det Hele eller enkelte af dens Regioner. Den cirkelrunde, indvendig straaleformig furede Mundaabning (Furerne strække sig hyppig et langt Stykke udad paa Mundskiven) er (Fig. 2, o) anbragt i Centrum af den flade eller noget concave Mundskive. Denne, som er stillet noget skraat nedad paa den forreste Ende af Kroppens Axe saaledes, at dens dorsale Del rager noget mere frem end den ventrale, bærer rundt om sin Rand en enkelt Kreds af 12 Tentakler (ibid. aa). Gatboret, som findes paa Kroppens bageste Ende, er en simpel cirkelrund, ofte indvendig straaleformig furet Aabning uden Flige (hos Myriotrochus er den, efter Steenstrup, femfliget).

The body (fig. 1 & 2) is in specimens of middle size 30—35 Mm. long (in spirit it shrinks to about half the size of the living animal) cylindrical or somewhat fusiform, being thickest (about 8 Mm.) in the middle of its length, tapering a little towards the anterior extremity and rather more towards the posterior extremity. (In the largest specimens found the body is 50 Mm. long and 12—13 Mm. thick across the middle). It is likewise (see fig. 1) in its whole length somewhat curved; the back, determined by the organs of generation there situated, and the anterior mesentery being more convex or curved outwards, and the belly-side rather concave. Otherwise the body assumes various forms by the greater or less degree of contraction of the whole or particular regions of it. The circular oral aperture (fig. 2 o)| the interior of which has radial furrows extending frequently to some distance outside, is situated in the centre of the slightly concave oral disc. The latter, placed with a slight downward inclination on the anterior extremity of the axis of the body, so that its dorsal part projects rather more than the ventral part, bears round its margin a single circular row of 12 tentacles (ibid. aa). The vent (anus), which is at the posterior part of the body, is a simple circular aperture, frequently with radial furrows in the interior, without lobes (in the Myriotrochus it is, according to Steenstrup, five-lobed).

Kroppens Hud er aldeles glat, svagt glindsende, temmelig tynd, og oftest ganske farveløs (hos Myriotrochus skal den, efter Lütken, være melkehvid), følgelig saa gjennemsigtig, at Dyrets Indvolde, Tarmcanalen, Generationsorganerne og Kalkringen skinne aldeles klart igjennem (cfr. Fig. 1 og 2). Den har som hos alle Holothurider paa Indsiden af den bindevævagtige Hud et Lag af fine, tætte, paralelle Tvær- eller Ringmuskelfibre, og under disse og krydsende dem ligge de 5 Længdemuskler (hvilke ikke, som ellers næsten overalt, bestaa af 2 Halvdele), 2 dorsale (Fig. 3, bb) (en paa hver Side af Ryggens Midtlinie) og 3 ventrale (den ene (Fig. 2, 6, 12, 14, h) langs ad Bugens Midtlinie, de 2 andre (ibid. c, c paa hver sin Side der, hvor Bugen gaar over i Ryggen), alle af omtrent lige Styrke, meget spæde og afsmalnende efterhaanden betydeligt imod Analenden. Da Kroppen er fuldkommen trind, er der ingen tydelig markeret Adskillelse af Ryg og Bug, heller ikke er der, saaledes som efter Steenstrup hos Myriotrochus, nogen Forskjel mellem Ryg og Bug i Farvningen. Man vil dog ved nærmere Undersøgelse finde, at de 2 paa den convexe Side af Kroppen eller Ryggen liggende Længdemuskler (Bivium) staa hinanden nærmere end de 3 øvrige (Trivium) (cfr. Fig. 6 og 14). Ogsaa ligger der kun 2 Tantakler mellem Insertionspunkterne af de 2 dorsale Længdemuskler, men 3 mellem samme og den yderste ventrale Længdemuskel paa hver Side, hvorimod der mellem den sidste Muskel og den uparrede midterste ventrale Muskel igjen kun ligger 2 Tentakler (cfr. Fig. 6). Der er saaledes i Grunden et virkeligt adskilt Bivium (Ryggen) og et Trivium (Bugen), skjøndt begge umærkeligt gaa over i

The skin of the body is completely smooth, slightly shining, rather thin, most frequently quite colorless (in the Myriotrochus it appears according to Lütken to be milkwhite) and consequently so transparent that the viscera, intestines, organs of generation and calcareous ring shine clearly through it (comp. fig. 1 & 2). It has, like all the Holothuridæ, on the inside of the skin, a layer of fine close parallel transverse or annular muscular fibres and under these and crossing them lie the 5 longitudinal muscles (which do not, as nearly everywhere else, consist of 2 halves), 2 dorsal (fig. 3 bb) (one on each side of the medial line of the back) and 3 ventral (fig. 2, 6, 12, 14 h) along the medial line of the belly, the 2 others (ibid c, c on either side in the lines of junction between belly and back) all about equal in power, very slight and tapering gradually and considerably towards the anal extremity. As the body has a circular transverse section, there is no distinctly marked separation between belly and back; nor is there, as according to Steenstrup in the Myriotrochus, any difference between back and belly in the coloration. It will however on closer examination be found that the 2 longitudinal muscles (Bivium) lying along the convex side of the body or the back are nearer to each other than the 3 others (Trivium) (comp. fig. 6 and 14). Further there are only 2 tentacles between the points of the 2 dorsal longitudinal muscles, but 3 between each of the same and the outer ventral longitudinal muscle on each side; while between the last named and the unpaired medial ventral muscle there are again only 2 tentacles on each side (comp. fig. 6). There are therefore really an actual separate Bivium (back)

hinanden ved et flygtigt Blik, og kun ved nøiere Opmærksomhed lade sig adskille.

Tentaklerne (Fig. 2, a, Fig. 4 og 5) ere paafaldende svagt (endnu mindre end hos Chirodota) udviklede, alle omtrent af lige Størrelse, meget korte (i udstrakt Tilstand hos middelstore Exemplarer 2 Mm. lange) og temmelig tykke, forlænget-coniske, og i deres øvre Halvdel besatte paa hver Side med en Række af 4, sjeldent (ligesom hos Synapta inhærens) 5 temmelig smaa og tynde, cylindriske eller fingerformige Grene, af hvilke den yderste eller øverste er størst og de længere nedenfor siddende efterhaanden kortere. Selve Tentakelens conisk-tilspidsede Ende rager langt ud over Fingrenes Insertion (hvilket ikke er Tilfældet hos Myriotrochus, hvis Tentakler, efter Steenstrups Afbildning, i denne Henseende mere ligne samme af Chirodota, d. e. synes at være peltato-digitata). De ligne følgelig Tentaklerne af Synapta, ikke af Chirodota, idet "et Plan, som lægges gjennem den høire og venstre Rad af Fingrene, deler Tentakelstilken i 2 lige Halvdele" (Semper), hvilket ikke er Tilfælde hos Chirodota, hvor det deler Stilken i 2 ulige Dele. Ved stærk Contraction antage Tentaklerne (cfr. Fig. 1, 3, a a, Fig. 6) Form af lave tykke rundagtige Papiller, og ved den øvre fligede Dels Indkrængning i den nedre eller basale Del fremkommer da den dem omgivende Hudfold, som Steenstrup omtaler hos Myriotrochus. En lignende Indkrængning af Tentakelenden i dens Stilk ligesom i en Skede forekommer ogsaa, efter Semper, hos nogle Synapter og Chirodoter. Iøvrigt kunne Tentaklerne ligesom den hele Mundskive ikke indrages i Kroppen — en Egenskab, hvorved denne Holothuride afviger fra alle andre mig bekjendte og som den maaske ogsaa deler med Myriotrochus. Fra det normale Antal af 12 fandtes hos ingen af mine talrige (over 50) Exemplarer nogen Afvigelse.

Af *Kalkplader* fandtes intet Spor i Huden af Tentaklerne. Ogsaa i Kroppens Hud søgte jeg hos de mindre Individer, der først faldt mig i Hænde, forgjæves efter saadanne, indtil jeg omsider hos større eller ældre fandt nogle faa, 3—4 indtil 8—10 i hvert af Intermuscularrummene nær ved Kroppens forreste og bagerste Ende, men ingen i den hele øvrige Strækning af Kroppen. Disse Kalkplader, der ligge enkeltvis og langt fra hverandre omspredte i Huden (ikke som hos Chirodota hobevis samlede inden i Blærer eller Papiller), ere overmaade smaa (de sees ikke med blotte Øine, og ved Lupen vise de sig kun som snehvide Punkter), glasklare og af en regelmæssig Hjulform. De bestaa nemlig (Fig. 15, 16, 17) af en ydre kredsrund Ring, som er sammensat af et forskjelligt Antal (17—24) lige store og ved ligesaa mange Furer fra hinanden adskilte Stykker, af hvilke hvert paa dets indre Rand bærer en indadvendt, forlænget-conisk (ikke som hos Myriotrochus „trefladet"), stærk Tand, og af et ligeledes forskjelligt Antal (10—16) cylindriske, glatte, ganske lidt buefor-

and a Trivium (belly); although to the casual observer both appear to go over imperceptibly into each other, and the distinction can only be ascertained by closer examination.

The tentacles (fig. 2, a, fig. 4 & 5) have a remarkably small development (still less than in the Chirodota) they are all about of the same size, very short (when extended in middle-sized specimens 2 Mm. long) and rather thick, elongated-conical, and in their upper half furnished on each side with a row of 4, seldom (as in the Synapta inhærens) 5, rather small and thin cylindrical or finger-like branches, of which the outermost or highest is largest, and those situated lower down are gradually shorter. The conically pointed end of the tentacle itself projects far beyond the insertion of the finger-like branches (which is not the case in the Myriotrochus, whose tentacles according to Steenstrup's delineation, have more resemblance in this respect to those of the Chirodata, i. e. seem to be peltato-digitata). The tentacles of O. vitreus resemble therefore those of Synapta, not those of Chirodata, as "a "plane lying between the right and left row of the fingers "divides the tentacle-stalk into 2 equal halves" (Semper) which is not the case in the Chirodota, where it divides the stalk into 2 unequal parts. By strong contraction the tentacles (comp. fig. 1, 3 aa, fig. 6) assume the form of low thick roundish papillæ, and by invagination of the upper lobed part in the lower or basal part there is formed that enveloping fold in the skin which Steenstrup mentions in the Myriotrochus. A similar invagination of the extremity into the stalk of the tentacle, as into a sheath, takes place also according to Semper in some Synaptæ and Chirodotæ. Otherwise the tentacles, like the whole oral disc, cannot be retracted into the body; a peculiarity wherein this Holothuride differs from all others known to me, and which it has perhaps also in common with the Myriotrochus. From the normal number of 12 tentacles there was no deviation in any of my numerous (over 50) specimens.

Of *Calcareous plates* there was no trace in the skin of the tentacles. Also in the skin of the body I sought, (in the smaller specimens that first fell into my hands) in vain for any such traces; until at last, in larger and older specimens I discovered some few — 3—4 and up to 8—10 in each of the intermuscular spaces near to the anterior and posterior extemities, but none in the whole remaining part of the body. These calcareous plates, which lie singly, and dispersed in the skin at a distance from each other, (not as in the Chirodata collected in groups enclosed in vesicles or papillæ) are extremely small (they are invisible to the naked eye, and appear under the magnifying glass as snow-white points) hyaline and of a regular wheel-form. They consist (fig. 15, 16, 17) of an exterior circular ring composed of a variable number (17—24) of pieces of equal size and separated from each other by an equal number of grooves; each piece bearing on its interior margin an elongated-conical (not as in the Myriotrochus "three sided")

migt nedad bøiede Eger eller Straaler, hvilke alle støde sammen i et cirkelrundt og noget convext Nav eller Umbo, som ligger dybere end Ringen, saa at Hjulets øverste Flade er lidt udhulet og har Formen af en ganske lav Kop. Yngre Hjul (Fig. 15, 16), der ere omtrent halvt saa store som de ældre, have sædvanlig færre og noget bredere Straaler end de ældre (Fig. 17), men ofte ligesaa mange Tænder som disse. Man vil af ovenstaaende Beskrivelse se, at Kalkhjulene hos nærværende Form have den største Lighed med samme af Myriotrochus Rinkii Steenstrup (Videnskabelige Meddelelser fra den naturhist. Forening i Kjøbenhavn 1851, Tab. 3, fig. 8), navnlig ved deres talrige Straaler og Ringens Besætning med stærke Tænder, hvorved de adskille sig fra de lignende Dannelser hos Chirodota, hvilke altid kun have 6 Straaler og mangle de stærke Tænder paa Ringen. Den eneste Afvigelse, de vise, bestaar deri, at de i Regelen have et ringere Antal af Straaler end hos Myriotrochus, og at disse i Antal ikke svare til Ringens Stykker eller Tænder, medens disses Antal stemmer overens med det for Myriotrochus normale. Som Exempler herpaa og paa Variationen i Antallet af baade Straaler og Tænder anføres her Antallet af disse Dele hos 10 forskjellige Hjul:

Kalkhjul.	Antal af Straaler.	Antal af Ringens Stykker og Tænder
No. 1. . .	. . . . 11	. . . . . 19.
— 2. . .	. . . . 10	. . . . . 23.
— 3. . .	. . . . 13	. . . . . 17.
— 4. . .	. . . . 12	. . . . . 21.
— 5. . .	. . . . 13	. . . . . 21.
— 6. . .	. . . . 12	. . . . . 24.
— 7. . .	. . . . 14	. . . . . 23.
— 8. . .	. . . . 16	. . . . . 19.
— 9. . .	. . . . 13	. . . . . 24.
— 10. . .	. . . . 11	. . . . . 22.

Hos Myriotrochus Rinkii svare derimod Straalerne nøiagtigt til og alternere med Ringens Stykker og disses Tænder.

En væsentlig Forskjel mellem vor Oligotrochus og Myriotrochus bestaar deri, at Hjulene hos den første ligge indsænkede i Huden, medens de hos Myriotrochus rage frit frem over Hudens Overflade, baarne paa Hudstilke; endvidere deres Forekomst alene nær ved begge Ender af Kroppen samt deres yderst ringe Antal, medens hos Myriochus Kroppens hele Overflade er saaledes „oversaaet med Kalkhjul, at der paa hver Qvadratmillimeter af Rygfladen kan regnes 9 Kalkhjul, og paa Bugfladen, hvor de staa mere spredte, 3“. Det bemærkes sluttelig, at Hjulene hos vort Dyr ere af betydeligt ringere Størrelse end hos Myriotrochus Rinkii.

Tarmkanalen, (Fig. 1 og 2, dd) der sædvanlig er fuldstoppet af Dynd og derfor skinner brunsort igjennem de

strong tooth turned inward; and of a likewise variable number (10—16) of cylindrical smooth spokes or rays very slightly curved downwards, all meeting together in a circular and somewhat convex nave or umbo which lies deeper than the ring; so that the upper surface of the wheel is a little hollowed and has the form of a quite shallow cup. Younger wheels (fig. 15—16) which are about half as large as the older ones, have usually fewer and somewhat broader spokes (fig. 17), but frequently not fewer teeth than the older wheels. It will be evident from the above description that the calcareous wheels in the present form have the greatest resemblance to those of Myriotrochus Rinkii Stenstrup (Videnskabelige Meddelelser fra den natnrhist. Forening i Kjøbenhavn 1851 Tab. 3, fig 8) especially in their numerous radii and in the strong teeth situated on the ring whereby they distinguish themselves from similar formations in the Chirodata, which have always only 6 radii and are destitute of the strong teeth on the ring. The only difference noticeable consists in the wheels having a smaller number of rays than in the genus Myriotrochus; and the rays not corresponding in number to the pieces or teeth of the ring, while the number of these latter is always the same as the normal number in the Myriotrochus. In illustration of this and of the variation in the numbers of both radii and teeth, the numbers of these parts in 10 different wheels are here noted.

Calcareous Wheels.	Number of radii.	Number of pieces and teeth in the ring.
No. 1.	. . . . 11	. . . . . 19.
— 2.	. . . . 10	. . . . . 23.
— 3.	. . . . 13	. . . . . 17.
— 4.	. . . . 12	. . . . . 21.
— 5.	. . . . 13	. . . . . 21.
— 6.	. . . . 12	. . . . . 24.
— 7.	. . . . 14	. . . . . 23.
— 8.	. . . . 16	. . . . . 19.
— 9.	. . . . 13	. . . . . 24.
— 10.	. . . . 11	. . . . . 22.

In the Myriotrochus Rinkii the radii correspond exactly and alternate with the pieces of the ring and their teeth.

One essential difference between our Oligotrochus and the Myriotrochus consists in the wheels in the former lying sunk in the skin; while those of the Myriotrochus project freely over the surface of the skin, being supported on skin-stalks. Another difference appears in the extremely small number of the wheels, and their occurrence only near to the extremities of the body, while the whole surface of the body in the Myriotrochus is so “overstrewn “with calcareous wheels that on every square millimetre “of the surface of the back, 9 calcareous wheels may be “counted, and on the ventral surface, where they are more “dispersed, 3”. Lastly it must be remarked, that the wheels in our animal are of considerably smaller size than in the Myriotrochus Rinkii.

The intestinal canal (fig. 1 and 2, dd.) which is usually full of mire, and therefore appears brownish black through

transparente Hudbedækninger, er temmelig ensformig vid i sin hele Længde, skjønt den meget hyppig ved langsomme peristaltiske Bevægelser udvides og forenges snart paa et snart paa et andet Sted. Den gjør, idet den først gaar nedad indtil omtrent den bageste Trediedel af Kroppen, derpaa vender i en skarp Bøining opad gjennem næsten Halvdelen af Kroppens Længde, og derpaa atter i en skarp Bøining lige ned til Gatboret, ligesom hos Chirodota og Myriotrochus en dobbelt Bøining som et *S*, saa at den udstrakt ikke er meget langtfra dobbelt saa lang som Kroppen. Den holdes i sin Stilling ved 3 meget tynde, af fine, men stærke elastiske Traade gjennemdragne Mesenterier, af hvilke det forreste eller dorsale (Fig. 3, 6, 14, m), som nøiagtigt betegner Ryggens Midtlinie og her forbinder sig med Generationsorganernes enkelte Udføringsgang, insererer sig paa Tarmens dorsale Kant og paa Indsiden af Huden i Midtlinien af det midterste dorsale Intermuscularrum, det andet (venstre) paa Tarmens anden eller opstigende Del og paa Huden i det venstre Intermuscularrum af Trivium, og det tredie (høire) til den sidste eller nedstigende Del af Tarmen og paa Huden i det høire Intermuscularrum af Bivium. Paa Mesenterierne, især paa det bageste, sidde hist og her enkelte opak hvide kugledannede Smaalegemer med fintkornet Indhold fastheftede, hvilke synes at svare til de tøffel- eller fyldehornformige Fimreorganer hos andre Synaptider. Jeg undersøgte dem desværre ikke i levende Tilstand og kan derfor intet videre sige om dem.

Kalkringen (Fig. 8—11), som omgiver Svælget og ved sin snehvide Farve skinner igjennem Kroppens Hud, er vel udviklet og som det syntes bestaaende af 10 sammensluttende, temmelig ($\frac{2}{3}$—$\frac{3}{4}$ Mm.) tykke Kalkstykker, hvilke ere saa fast forvoxne med hinanden, at deres Forvoxningslinier blive utydelige og deres Antal følgelig ikke med Bestemthed kan angives; de danne tilsammen en solid kredsrund Ring af 4—4$\frac{1}{2}$ Mm. Vide hos middelstore Individer. Denne Ring har Form af en lav Krone, hvis nedre eller bageste Rand har 10 mere eller mindre dybe Indbugtninger, medens den øvre eller forreste (Fig. 8) bærer 12 triangulære Spidser (hos et Individ, og det et af de største, fandtes kun 11 Spidser, idet den midterste dorsale (som er et interradialt Stykke) fattedes), de 8 hver over en tilsvarende Indbugtning af den nedre Rand, de øvrige 2 og 2 over hver af de 2 øvrige tilsvarende Indbugtninger af samme. Af de 10 omtrent lige brede Kalkstykker, der sammensætte Ringen, har nemlig det ene, ifølge Analogi med Slægten Echinocucumis (M. Sars, Oversigt af Norges Echinodermer pag. 107) det midterste dorsale, som er et interradialt, kun en enkelt saadan Spids (cfr. Fig. 9), det nærmeste Kalkstykke, som er et radialt, paa hver Side af hint derimod 2 Spidser, medens alle de øvrige 7 kun have en enkelt Spids. De 5 radiale Stykker have nær ved deres forreste Ende et lidet rundt Hul, gjennem hvilket den radiale Nervestamme træder ud; tæt bag dette Hul er en af Kroppens 5 Længdemuskler insereret. Mellem hvert Par Spidser er Ringens øvre eller forreste ydre Rand eller Flade fordybet, og i hver af disse

the transparent skin covering, is of about the same width in its whole length; although very often it expands and contracts by slow peristaltic movements first in one place and then in another. It makes a double curve like an *S*, going first downwards to about the posterior third part of the body, then turning in a sharp bend upwards through nearly half of the body's length, and then again in a sharp bend straight down to the anus as in Chirodota and Myriotrochus; so that it would be if extended, nearly twice as long as the body. It is retained in position by 3 very thin mesenteries, through which run fine but strong elastic filaments, and of which the anterior or dorsal one (fig. 3, 6, 14 m) exactly indicating the medial line of the back and here connecting itself with the single excretory canal of the generative organs, is inserted on the dorsal side of the intestine and on the inside of the skin, in the medial line of the central dorsal intermuscular space; the second (the left) on the second or ascending part of the intestine, and on the skin in the left intermuscular space of the trivium; and the third (the right) to the last or descending part of the intestine, and on the skin in the right intermuscular space of the bivium. On the mesenteries, and especially on the posterior one, there are attached here and there isolated opaque white globular molecules with finely granulated contents, apparently corresponding to the pantofle-like or cornu-copiæ-like ciliated organs in other Synaptidæ. Unfortunately I did not examine them in the living animal, and I cannot therefore say anything further about them.

The calcareous ring (fig. 8—11) which surrounds the gullet, and shines snow-white through the skin of the body, is well developed and apparently consists of 10 closely fitting rather ($\frac{2}{3}$—$\frac{3}{4}$ Mm.) thick pieces so firmly attached to each other that their lines of connexion are indistinct, and their number consequently is not accurately discernible; they form together a solid circular ring 4—4$\frac{1}{2}$ Mm. wide in specimens of medium size. This ring has the form of a low crown, the lower or posterior margin of which has 10 more or less deep sinuosities, while the upper or anterior margin (fig. 8) bears 12 triangular points (in one specimen and that one of the largest, there were only 11 points, as the middle dorsal (which is an interradial piece) was wanting, 8 of them each over a corresponding sinuosity of the lower margin; the others 2 and 2 over each of the 2 other corresponding sinuosities of the same. Of the 10 about equally broad calcareous pieces which compose the ring, one, namely according to analogy with the genus Echinocucumis (M. Sars Oversigt af Norges Echinodermer p. 107) the middle dorsal, which is interradial, has only a single point (comp. f. 9), the nearest pieces on each side of it, which are radial, having each 2 points, while all the other 7 have each only a single point. The 5 radial pieces have near to their anterior extremity a small round hole, through which the radial nervous trunk protrudes; close behind this hole is inserted one of the 5 longitudinal muscles of the body. Between each pair of points the upper or anterior exterior margin of the ring is depressed;

Fordybninger er en Tentakel fæstet. Alle Spidser staa i lige Afstand fra hinanden med Undtagelse af de paa de 2 før nævnte Kalkstykker siddende dobbelte, hvilke ere noget, skjønt ikke betydeligt, mere nærmede til hinanden indbyrdes end de øvrige. — Ved nærmere Betragtning finder man i Svælgringen af vort Dyr meget tydelige Spor af bilateral Symetri. Denne viser sig ikke alene i Tilstedeværelsen af de 2 med dobbelt Spids forsynede Kalkstykker, et paa hver Side af det, sigesom de 7 øvrige, kun med en enkelt Spids besatte midterste dorsale Stykke, men ogsaa deri, at disse 3 Stykker, især det midterste, ere lavere eller kortere end de øvrige, hvilke efterhaanden blive høiere jo mere de fjerne sig fra hine, saa at de 2 lige overfor hine beliggende midterste ventrale Stykker (Fig. 9—11, v) hvis nederste Rands Indbugtninger derved ogsaa blive dybere end paa de øvrige) næsten have den dobbelte Høide, nemlig $1\frac{1}{3}$ Mm., af hine, af hvilke det midterste kun er $\frac{3}{4}$ Mm. høit. Den midterste ventrale Længdemuskel er fæstet imellem de 2 høieste Stykker af Svælgringen, hvis laveste Stykker ere dorsale. Disse sidste ligge ogsaa noget længere fortil end hine, idet Ringen er i dens dorsale Del lidt bøiet og derved her mere fremragende end i ventrale.

Af det Anførte er det klart, at Kalkringen af vort Dyr paa det nærmeste stemmer overens med samme af Myriotrochus Rinkii efter Lütkens Beskrivelse (Grønlands Echinodermata p. 22), med Undtagelse af, at den danske Forsker intet nævner om nogen Forskjel i Størrelsen af de Ringen sammensættende Stykker.

Ambulacralsystemets Centraldel bestaar af en Spiserøret omgivende, tæt under eller bag Svælgringen beliggende Ringcanal (Fig. 12, 13, l), hvis Omrids er noget bugtet i Form af en Polygon, og det som det syntes en 8kantet, dog med ulige store Sider; Polygonens stumpt afrundede Hjørner ere fæstede til Kalkringens bageste Rand, men dens Sider ere frie og indbugtede samt indleirede i Mundskivens Bindevævslag. Fra Ringcanalens forreste eller øverste Flade udgaa 12 blinde Forlængelser ind i Tentaklerne, hvis Hule de beklæde. Ambulacralkar fattes ligesom hos alle Synaptider. Fra den bageste Flade af Ringcanalen, lige indenfor en af de 5 Længdemuskler, hænger en eneste, anselig (omtrent 3 Mm. lang), efter dens forskjellige Contractionsgrad snart flaskeformig snart kølledannet, hyalin (med enkelte brune Pigmentpunkter i dens Endedel besat) Polisk Blære (Fig. 12, 13, p) frit ind i Kroppens Hule, samt en tæt ved eller i det dorsale Mesenterium siddende liden (lidt over $\frac{1}{3}$ i Diameter holdende) opak hvid Madreportuberkel (Fig. 12, r), (som indeholdt en blød, ikke synlig kalkagtig Masse) baaren paa en kort cylindrisk, hyalin Stilk (Stencanalen), ligeledes frit fremragende. Hos nogle Individer var der endnu en eller endog to mindre Madreportuberkler (Fig. 13 r, r) i nogen Afstand paa den ene eller begge Sider af den første.

and in each of these depressions there is attached a tentacle. All the points are equidistant excepting the double points on the 2 calcareous pieces before mentioned, which are somewhat, although not considerably, nearer to each other than the others. On closer examination we find in the calcareous ring of our animal very evident traces of bilateral symmetry. This symmetry appears not only in the presence of the 2 double-pointed calcareous pieces one on each side of the middle dorsal piece, which, like the 7 others has only one point—but also in these 3 pieces, especially the middle one, being lower or shorter than the others, which latter gradually become higher the further they recede from the former; so that the 2 middle ventral pieces (fig. 9—11 v.) (the lower marginal sinuosities of which thereby become deeper than those of the others) are nearly twice as high as the middle dorsal, namely $1\frac{1}{3}$ Mm., the central dorsal piece being only $\frac{3}{4}$ Mm. high. The medial ventral longitudinal muscle is attached between the 2 highest pieces of the calcareous ring, the lowest pieces of which are dorsal. These lowest dorsal pieces are also somewhat more in front than the others; the ring being a little bent forward in its dorsal part, which therefore projects beyond the ventral part.

From what has been said it is evident that the calcareous ring of our animal corresponds most closely with the ring of Myriotrochus Rinkii according to Lütken's description (Grønlands Echinodermata p. 22) excepting that the Danish naturalist does not mention any difference in the size of the pieces of which the ring is composed.

The central part of the ambulacral system consists of an annular canal (fig. 12, 13, l) encircling the esophagus close under or behind the calcareous ring; the outline of this canal being somewhat bent in the form of a polygon, and apparently 8-sided, but with sides of unequal length. The obtusely rounded angles of rhe polygon are attached to the posterior margin of the calcareous ring; but its sides are free and curved invards and also imbedded in the layer of connecting tissue of the oral disc. From the anterior or upper surface of the circular canal, there issue 12 cæca-like continuations entering into the tentacles and lining their cavity. The ambulacral vessel is wanting as in all Synaptidæ. From the posterior surface of the circular canal, just to the inside of one of the 5 longitudinal muscles, there hangs a single ambulacral vesicle (vesicle of Poli) (fig. 12, 13, p) of considerable size (about 3 Mm. long) in the cavity of the body. This vesicle is, according to its different degrees of contraction, sometimes bottle-shaped, sometimes club-shaped, and hyaline (with isolated brown pigmentary points at its extremity; and close to it, or in the dorsal mesentery, there is a small (rather more than $^1/_3$ Mm. in diameter) opaque white Madrepoic tubercle (fig. 12, r) which contains a soft, white, not perceptibly calcareous mass and is supported on a short cylindrical hyaline stalk (the stone canal) also projecting freely. In some specimens there appeared one or even two smaller Madreporic tubercles (fig. 13 r, r) at some distance on one or on both sides of the former.

Foran eller over Ringcanalen ligger indenfor Kalkringens forreste Rand *Nerveringen* (Fig. 14, n). Den er forholdsvis ikke saa ganske tynd og lidt pentagonal, idet der fra dens Peripheri udgaar 5 Nervestammer, der gjennembore Kalkringens 5 radiale Stykker, og begive sig hver til sin respective Krops-Længdemuskel, hvis Løb de følge.

Generationsorganerne (Fig. 1—3, e, Fig. 7, e), hvilke neppe strække sig udover den første Sjettedel af Kroppens Længde, ere hos yngre Individer endnu mindre og bestaaende af kun nogle faa Rør (hos endnu yngre er der intet Spor af dem at bemærke). De danne 2 symmetriske paa hver sin Side af Tarmcanalen tæt bag Kalkringen paa Dyrets Rygside beliggende Partier (Fig. 7, e), hvis begge Stammer forene sig fortil i det midterste dorsale Intermuscularrum til en eneste temmelig kort og smal Udføringsgang (ibid. k), som ligger tæt til Indsiden af Kroppens Hud i det derværende dorsale Mesenterium (Fig. 3, m) (hvilket befæster Tarmens første nedstigende Del og tydeligt skinner gjennem Kroppens Hud langs Midtlinien af bemeldte Intermuscularrum, betegnende Dyrets Midtlinie, paa begge Sider af hvilken en bilateral Symetri kan bemærkes af mange eller de fleste af Dyrets Organer) og aabner sig udadtil umiddelbart bag eller under Tentakelkrandsen paa en liden rund Papille (Fig. 1, 3 7, f), som dog ofte er langt fremragende over Hudens Overflade som en cylindrisk 3 Gange længere end tyk Fortsats. Hvert Parti, som i udviklet Tilstand hos middelstore Individer omtrent er 5 Mm. langt, danner (Fig. 7, e) et rundagtigt Knippe af talrige (jeg talte 30—40), mest dichotomisk forgrenede, korte, temmelig tykke, trinde Rør, hvilke alle ere Grene af en eneste tynd Stamme, som allerede ved Basis deler sig i 2 Hovedgrene. De ere smalere ved deres Udspring og tykkere i deres but tilrundede Ende; de forreste ere kortere, længere bagtil efterhaanden længere, og af en opak gulhvid Farve, hvorved de skinne klart igjennem Kroppens farveløse Hud. Deres Indre var hos nogle Individer fyldt med talrige, temmelig store, lidt ovale Æg med hvid halvgjennemsigtig Blomme, og en kugledannet Kimblære næsten af Æggets halve Diameter, hvori en rund af mange Smaakorn fyldt mørkere Kimplet. Generationsorganerne indtage som sagt kun en ringe Del, omtrent den forreste Sjettedel, af Dyrets Længde. Ved deres stærke Forgrening afvige de fra samme af vore andre norske lunge- og fodløse Holothurider, nemlig Synapta inhærens og Chirodota pellucida, hos hvilke der i hvert af de 2 Partier kun findes 2—5 Genitalrør, der ogsaa ere betydeligt længere og forholdsvis langt tyndere (ogsaa hos de af Semper afbildede Arter af Synaptider ere de meget tynde), og synes i denne Henseende mere at stemme overens med Myriotrochus og Eupyrgus.

Kroppens Hud er, som allerede før anført, glasklar og og oftest farveløs; kun hos et Par Individer havde den et yderst svagt grøntlignende Anstrøg, som i den bageste Ende, stundom ogsaa i den forreste, gik over til lys rødligt eller

In front of the circular canal or above it, and within the anterior margin of the calcareous ring, lies the nervous ring (fig. 14, n). It is relatively not very thin, and rather pentagonal; as there issue from its periphery 5 trunks traversing the 5 radial pieces of the calcareous ring, connecting themselves each with its respective longitudinal muscle of the body, and following the course of the same.

The organs of generation (fig. 1—3, e, fig. 7, e) which scarcely extend over the first sixth part of the length of the body, are in younger specimens still smaller, and consist of only some few tubes (in still younger specimens no trace of such organs is perceptible). They form 2 symmetrical parts (fig. 7, e) situated on each side of the intestinal canal, close behind the calcareous ring on the dorsal side of the animal. The stems of both these parts unite in front in the central dorsal intermuscular space, forming a single, rather short and narrow excretory canal (ibid. k) which lies close to the inside of the skin of the body in the dorsal mesentery (fig. 3, m), which fixes the first descending part of the intestine and distinctly appears through the skin of the body, along the medial line of the said intermuscular space; indicating the medial line of the animal, on both sides of which a bilateral symmetry of many or most of the organs may be observed) and opens outwards, immediately behind or below the circle af tentacles, on a small round papilla (fig. 1, 3, 7, f) which yet is sometimes very prominent above the surface of the skin, like a cylindrical process 3 times as long as it is thick. Each part, which in a developed state in specimens of middle size is about 5. Mm. long, forms (fig. 7, e) a roundish dense fascicle of numerous (I counted 30—40) mostly dichotomically ramified, rather thick round tubes which are all branches of a single thin stem that already at its base is divided into 2 main branches. They are smaller at their source, and thicker at their obtusely rounded extremity; the foremost are shorter: those further back gradually longer, and of an opaque yellowish white color, shining clearly through the colorless skin of the body. Their interior was in some specimens filled with numerous, rather large, slightly oval eggs with a white half transparent yolk, and a globular germinative vesicle of nearly half the egg's diameter, wherein a circular darker germinative spot filled with many small granules. The organs of generation occupy as before mentioned only a small part, about the anterior sixth part of the animal's length. By their strong ramification they differ from those of our other Norwegian lung-less and foot-less Holothurians, namely Synapta inhærens and Chirodota pellucida, in which there are found in each of the 2 halves only 2—5 genital tubes, which are also considerably longer and relatively much thinner (they are likewise very thin in the species of Synaptidæ delineated by Semper) and they appear in this respect to agree more with the Myriotrochus and Eupyrgus.

The skin of the body is, as already mentioned, highly pellucid and often colorless; only in a few specimens it had an extremely faint greenish-gray tint, which at the posterior extremity and sometimes also at the anterior

brunligt. Tentaklerne ere sædvanlig noget brunagtige i deres ydre fligede Del; Mundskiven var hos enkelte Individer lys græsgrønlig. Generationsorganerne skinne ved deres gulhvide Farve igjennem Kroppens transparente Hud.

Medens de nærmest beslægtede af vore norske Holothurider, nemlig Synapta inhærens og Chirodota pellucida, begge leve nær ved Stranden, fra Lavvandsmærket indtil 10, sjeldent 20 Favne, har jeg altid fundet den her beskrevne, ligesom en tredie norsk Art, Synapta tenera Norman, paa dybt Vand, 50—200 Favne, dyndet eller blød Lerbund, hidtil kun paa faa Localiteter, ved Drøbak i Christianiafjorden (Storemedet tæt ved Byen og lige ud for et Teglværk $\frac{1}{4}$ Mil sydligere) paa 50—60 F., Rødtangdybet, 100—120 F., og ved Vallø paa 200 F. Den lever her nedgraven i det bløde Dynd, men er idethele sjelden. Endelig har min Søn fundet den ved Skraaven i Lofoten lige ned til 300 F. Huden sprækker hos de fleste Exemplarer, naar man faar dem op og ikke haandterer dem med den største Varsomhed, tværsover den forreste Del af Kroppen, saa at Hovedet, om man saa kan kalde det, d. e. Mundpartiet med Tentakelkrandsen og Halsen med Svælget og Svælgringen, afløser sig fra den øvrige Krop og Tarm. Synapta inhærens bryder sig derimod ved transversale Indsnøringer nær ved den bageste Ende af Kroppen og successive længere fortil i et større eller mindre Antal af Tværstykker, og Chirodota pellucida sprækker næsten aldrig.

Efter den meddelte Beskrivelse er det klart, at nærværende Holothuride staar nærmest ved Slægten Myriotrochus Steenstrup og, ligesom denne, er den sandsynlig en arktisk, med flere andre høinordiske Dyr paa de anførte Localiteter i Christianiafjorden igjenlevende Form. Den viser sig i de fleste Henseender, og navnlig i den mangestraalede Form af dens Kalkhjul og deri, at disse ere enkeltvis stillede, ikke indesluttede gruppevis i en Blære, saa overensstemmende med den nævnte Slægt, at man kunde være fristet til at opføre den som en anden Art af denne. Imidlertid er der dog, som allerede ovenfor paavist, nogle Punkter i dens Bygning, hvilke synes at gjøre en generisk Adskillelse fornøden. Først nemlig den næsten fuldkomne Mangel af Kalkafleiringer i Huden, idet der kun i den forreste og bageste Del af Kroppens Hud finder et meget ringe Antal af mikroskopiske Kalkhjul, medens disse hos Myriotrochus findes i stor Mængde over den hele Krop. Dernæst, at disse Kalkhjul ligge indsænkede i Kroppens Hud, hos Myriotrochus derimod ragende frem over dens Overflade baarne paa Hudstilke. Endelig, at Hjulene i Regelen have et ringere Antal af Straaler og at disse ikke, saaledes som hos Myriotrochus, i Antal svare til Ringenes Stykker eller disses Tænder.

Ogsaa i Tentaklernes Form synes der at være nogen Forskjel, idet de hos vort Dyr mere ligne Synapta derved, at de ere trinde, conisk-tilspidsede og i deres ydre Del besatte med fingerformige Grene paa begge

extremity went over to a light red or brown. The tentacles are usually somewhat brownish in their outer lobed part; the oral disc was in some specimens light grass-green. The organs of generation shine yellowish white through the transparent skin of the body.

While the nearest related of our Norwegian Holothuridæ, namely the Synapta inhærens and Chirodota pellucida, both live near the shore, from low-watermark to 10, seldom 20 fathoms, I have always found the species here described, as also a third Norwegian species viz. Synapta tenera Norman, in deep water 59—200 fathoms, on miry or soft clay bottom, hitherto only in few localities: at Drøbak in the Christianiafjord (Storemedet close to the town, and just off some tile-works $\frac{1}{4}$ mile more to the south) in 50—60 fathoms; in Rødtang-deep 100—120 fathoms, and at Vallø in 200 fathoms. It lives here buried in the soft mire, but is on the whole rare. Finally my Son has found it at Skraaven in Lofoten even at the depth of 300 fathoms. In most specimens, if when the animal is drawn up, it is not handled with the greatest care, the skin bursts across the anterior part of the body; so that the head, if one may call it so, that is the oral part with the circle of tentacles, and the throat with the gullet and calcarous ring — separates itself from the rest of the body and the intestine. Synapta inhærens on the other hand, breaks by transversal instrictions near to the posterior part of the body and successively further forwards, into a greater or less number of transverse fragments; and the Chirodota pellucida scarcely ever breaks at all.

According to the description here communicated, it is evident that the present Holothurian stands nearest to the genus Myriotrochus Steenstrup; and like the latter it is probably an arctic form surviving in the Christianiafjord with many other animals belonging to high latitudes. It shews in most respects, particularly in the many-rayed form of its calcarous wheels and in these wheels being placed singly, not enveloped group wise in a vesicle — so much conformity with the genus mentioned, that one might be tempted to class it as another species of the same genus. There are however, as already previously shewn, some points in its structure which appear to require a generic distinction. First namely, the almost total absence of calcareous deposits in the skin; only a very small number of microscopic calcareous wheels being found in the anterior and posterior part of the skin of the body and none elsewhere; while in the Myriotrochus on the contrary they are found in great numbers over the whole body. Next, that these calcareous wheels lie sunk in the skin of the body, while in the Myriotrochus they project above its surface supported on skin-stalks. Finally, that the wheels have usually a smaller number of rays, which moreover do not, as in the Myriotrochus, correspond in number with the pieces of the ring or with its teeth.

Also in the form of the tentacles there appeares to be some difference; the tentacle of our animal being more like those of the Synapta, round, conically pointed and in their outer part furnished with finger-like branches on both

Sider af Stammen, hvis Ende (som man hos Synapta har kaldet Tommelfinger) rager frem foran eller ud over hine Grene, medens de hos Myriotrochus, efter Steenstrups Beskrivelse og Afbildning (l. c. fig. 9), synes ligesom hos Chirodota at være i Enden skive- eller haanddannede (tentacula peltato-digitata), idet deres ydre Halvdel er bredere, affladet paa den ydre Side, og Randen besat med fingerformige Grene og uden nogen ud over disse fremragende Ende (Tommelfinger) af Stammen.

Jeg foreslaar derfor Navnet Oligotrochus (formedelst det ringe Antal af Kalkhjul) for den nye Slægt, som kunde charactericeres saaledes:

Oligotrochus M. Sars, novum genus e Holothuridarum apneumonum et apodum ordine.

Corpus crassiusculum seu haud multo elongatum, teres, subcylindricum aut subfusiforme, cute tenui, glaberrima, præter corpuscula perpauca minutissima calcarea, rotiformia, multiradiata, singula (non acervatim accumulata), sparsa, non petiolata, sed cuti immersa, laminis calcareis destitutum. Discus oralis paulo inclinatus. Tentacula 12, in partem eorum basalem qvasi in vaginam retractilia, non autem in corpus abscondenda, brevissima, elongato-conica, utrinqve digitata. Musculi corporis longitudinales 5 gracillimi, duo dorsales (bivium) magis approximati qvam ceteri fere æqvidistantes (trivium). Intestinum ansam duplicem componens. Os anticum, subventrale; anus posticus circularis, haud lobatus. Vesica Poliana unica; tubercula madreporiformia 1—3. Tubi genitales ramosi, breves, crassi, fasciculos duos componentes. Annulus calcareus pharyngeus bene evolutus, humilis, e laminis ut videtur 10 constans intime connatis, fere æqve latis, ventralibus altioribus, dorsalibus humilioribus, margine anteriore cuspidibus 12 triangularibus ornato.

O. vitreus M. Sars.

Corpus antice parum, postica magis angustatum, paulo curvatum, dorso convexiore, prorsus hyalinum, subrigidum, 50 Mm. longum, medio 12—13 Mm. crassum. Tentacula utrinqve digitis 4, raro 5, parvis, basin versus brevioribus. Corpuscula calcarea rotiformia solummodo prope extremitates corporis sita, minutissima (oculo nudo inconspicua), subconcava seu subcupuliformia, multiradiata, dentata; annulo rotæ e particulis æqvalibus (17—24) composito, unaqvaqve dente magno elongato-conico introrsum verso munita; radiis qvam illis paucioribus (10—16), cylindricis, subarcuatis, in umbonem medium convergentibus.

Habitat haud freqvens in sinu Christianiensi ad Drøbak et Vallø in profunditate limosa 50—200 orgyarum, nec non ad Skraaven, insulam Lofotensem, usqve ad 300 orgyas.

FORKLARING AF FIGURERNE.

Tab. 7, Fig. 1 forestiller *Oligotrochus vitreus* seet fra Siden og noget ovenfra; *a* de contraherede Tentakler; *b* en af de dorsale Længdemuskler; *c* en af de ydre ventrale Længdemuskler; *d d* Tarmcanalen; *e* Generationsorganerne; *f* den lille cylindriske Papille, hvorpaa disse udmunde.

Fig. 2. Et andet Individ seet fra den venstre Side, fuldt udstrakt

sides of the stem, the extremity of which (called in the Synapta the thumb) projects before or beyond these branches, while in the Myriotrochus according to Steenstrup's description and delineation (l. c. fig. 9) they seem as in the Chirodata to be disc-like or hand-shaped at the extremity (tentacula peltato-digitata) their outer half being broader and flattened on the outside, and having finger-like branches on the margin, without any projecting extremity of the stem thumb beyond them.

I suggest therefore the name Oligotrochus (on account of the small number of calcareous wheels) for the new genus which may be characterised as follows.

Oligotrochus M. Sars. Novum genus e Holothuridarum apneumoneum et apodum ordine.

Corpus crassiusculum seu haud multo elongatum, teres, subcylindricum aut subfusiforme, cute tenui, glaberrima, præter corpuscula perpauca minutissima calcarea, rotiformia, multiradiata, singula (non acervatim accumulata), sparsa, non petiolata, sed cuti immersa, laminis calcareis destitutum. Discus oralis paulo inclinatus. Tentacula 12, in partem eorum basalem qvasi in vaginam retractilia, non autem in corpus abscondenda, brevissima, elongato-conica, utrinqve digitata. Musculi corporis longitudinales 5 gracillimi, duo dorsales (bivium) magis approximati qvam ceteri fere æqvidistantes (trivium). Intestinum ansam duplicem componens. Os anticum, subventrale; anus posticus, circularis, haud lobatus. Vesica Poliana unica; tubercula madreporiformia 1—3. Tubi genitales ramosi, breves, crassi, fasciculos duos componentes. Annulus calcareus pharyngeus bene evolutus, humilis, e lamimis ut videtur 10 constans intime connatis, fere æqve latis, ventralibus altisribus, dorsalibus humilioribus, margine anteriore cuspidibus 12 triangularibus ornato.

O. vitreus M. Sars.

Corpus antice parum, postice magis angustatum, paulo curvatum, dorso convexiore, prorsus hyalinum, subrigidum, 50 Mm. longum, medio 12—13 Mm. crassum. Tentacula utrinque digitis 4, raro 5, parvis, basin versus brevioribus. Corpuscula calcarea rotiformia solummodo prope extremitales corporis sita, minutissima (oculo nudo inconspicua), subconcava seu subcupuliformia, multiradiata, dentata; annulo rotæ e particulis æqvalibis (17—24) composito, unaqvaqve dente magno elongato-conico introrsum verso munita; radiis qvam illis paucioribus (10—16), cylindricis, subarcuatis, in umbonem medium convergentibus.

Habitat haud freqvens i sinu Christianiensi ad Drøbak et Vallø in profunditate limosa 50—200 orgyarum, nec non ad Skraaven, insulam Lofotensem, usqve ad 300 orgyas.

EXPLANATION OF THE FIGURES.

Tab. 7, fig. 1, represents *Oligotrochus vitreus* slightly magnified, viewed from one side and a little from above. *a* the contracted tentacles; *b* one of the dorsal longitudinal muscles; *c* one of the exterior ventral longitudinal muscles; *d d* the intestinal canal; *e* the organs of generation; *f* the small cylindrical papilla in which is their outlet.

Fig. 2. Another specimen viewed from the ventral side, fully

og med udbredte Tentakler; *o* Mundaabningen; *h* den midterste ventrale Længdemuskel. De øvrige Bogstaver som paa Fig. 1.

Fig. 3. Den forreste Del af Kroppen seet fra den dorsale Side, stærkere forstørret, visende de contraherede Tentakler *(a)*; Begyndelsen af Tarmcanalen *(d)*; de dorsale Længdemuskler *(b b)*; Generationsorganerne *(e e)*; og det dorsale Mesenterium *(m)*.

Fig. 4. En Tentakel stærkt forstørret.

Fig. 5. En anden Tentakel med 5 fingerformige Grene paa hver Side.

Fig. 6. Mundskiven tilligemed det tilgrændsende Parti af Huden, seet forfra; *a* de contraherede Tentakler; *b b* de 2 dorsale Længdemuskler; *c c* de ydre ventrale Længdemuskler; *h* den midterste ventrale Længdemuskel; *o* Mundaabningen.

Fig. 7. Generationsorganerne tilligemed et Stykke af den dorsale Hud seet fra den indre Side; *e* de stærkt udviklede drueklaseformige Generationsorganer; *k* deres Udførselsgang; *f* den lille ydre Papille, paa hvis Ende Udførselsgangen udmunder.

Fig. 8. Kalkringen seet forfra; *d* den dorsale, *v* den ventrale Side.

Fig. 9. Samme seet fra den dorsale Side; *v—d* som Fig. 8.

Fig. 10. Samme seet fra den ventrale Side.

Fig. 11. Samme seet fra den høire Side.

Fig. 12. Kalkringen tilligemed Ambulacralsystemets Hoveddele seet fra den indre eller bageste Side; *a a* Kalkringen; *b b* de 2 dorsale Længdemuskler; *c c* de 2 ydre ventrale Længdemuskler; *h* den midterste ventrale Længdemuskel; *d* den forreste afskaarne Ende af Tarmcanalen; *ee* de her kun lidet udviklede Generationsorganer med sin fælles Udførselsgang (k); *l l* Ambulacralsystemets Ringcanal; *p* den Poliske Blære; *r* Madreportuberkelen.

Fig. 13. Halvparten af Kalkringen tilligemed Ambulacralsystemet hos et andet Individ, udmærket ved 3 adskilte Madreportuberkler (*r r r*). Bogstaverne forøvrigt som paa Fig. 12.

Fig. 14. Kalkringen med det tilgrændsende Parti af Huden, efterat Ambulacralsystemet er fjernet, seet fra den indre Side; *m* det dorsale Mesenterium; *n* Nerveringen med de fra denne udgaaende 5 radiale Nervestammer; *o* Mundaabningen. De øvrige Bogstaver som paa Fig. 12 og 13.

Fig. 15, 16, 17. Kalkhjul af Kroppens Hud.

STICHOPUS NATANS, M. Sars.

n. sp.

(Pl. 7, Fig. 18—41).

Holothuria natans, M. Sars, Vid.-Selsk. Forh. for 1867, p. 20.

Denne mærkelige Form, der synes at være temmelig almindelig paa de store Dybder ved Lofoten, hvor min Søn først fandt den i Vinteren 1865, henførte jeg først til Slægten Holothuria L., men har ved senere Undersøgelser fundet, at den tilhører den tidligere ikke i vore Have bekjendte Slægt *Stichopus* Brandt, hvis Arter næsten samtlige ere tropiske.

De største Exemplarer ere i contraheret Tilstand (paa Spiritus) 6″ lange, altsaa næsten ligesaa store som de største Exemplarer af *Holothuria tremula* Gunner. I fuldt udstrakt Tilstand (Fig. 18) er Kroppen temmelig

extended and with extended tentacles. *o* the bucal aperture; *h* the central ventral longitudinal muscle. The other letters as in fig. 1.

Fig. 3. The anterior part of the body viewed from the dorsal side, more strongly magnified, shewing the contracted tentacles *(a)*, the beginning of the intestinal canal *(d)*, the 2 dorsal longitudinal muscles *(b b)*, the organs of generation *(e e)*, and the dorsal mesentery *(m)*.

Fig. 4. A tentacle strongly magnified.

Fig. 5. An other tentacle with 5 finger-like branches on each side.

Fig. 6. The bucal disc together with the adjacent skin; front view. *a* the contracted tentacles; *b b* the 2 dorsal longitudinal muscles; *c c* the exterior ventral longitudinal muscles; *h* the medial ventral longitudinal muscle; *o* the bucal aperture.

Fig. 7. The organs of generation together with a portion of the dorsal skin viewed from the interior side. *e* the strongly developed cluster-like organs of generation; *k* their excretory canal; *f* the small exterior papilla from which their outlet opens.

Fig. 8. The calcareous ring, front view; *d* the dorsal, *v* the ventral side.

Fig. 9. The same, viewed from the dorsal side. *v—d* as in fig. 8.

Fig. 10. The same, viewed from the ventral side.

Fig. 11. The same, viewed from the right side.

Fig. 12. The calcareous ring together with the principal parts of the ambulacral system viewed from the interior or posterior side. *a a* the calcareous ring; *b b* the 2 dorsal longitudinal muscles; *c c* the 2 exterior ventral longitudinal muscles; *h* the medial ventral longitudinal muscle; *d* the anterior truncated extremity of the intestinal canal; *e e* the organs of generation here only slightly developed with their common outlet *(k)*; *l l* the circular canal of the ambulacral system; *p* the ambulacral vesicle; *r* the madreporic tubercle.

Fig. 13. One half of the calcareous ring together with the ambulacral system in another specimen remarkable for 3 distinct madreporic tubercles *(r r r)*; the letters otherwise as in fig. 12.

Fig. 14. The calcareous ring with the adjacent skin after removal of the ambulacral system, viewed from the interior side. *m* the dorsal mesentery; *n* the nervous ring with the 5 radial trunks proceeding from it; *o* the bucal aperture. The other letters as in fig. 12 and 13.

Fig. 15, 16, 17. Calcareous wheels from the skin of the body.

STICHOPUS NATANS, M. Sars.

n. sp.

(Pl. 7, fig. 18—41.)

Holothuria natans, M. Sars. Vid. Selsk. Forh. f. 1867, p. 20.

This remarkable form which appears to be rather common in the great deeps at Lofoten, where my son first found it in the winter of 1865, was first referred to the genus Holothuria L. but on more recent examination I have discovered that it belong to the genus *Stichopus* Brandt hitherto unknown in our seas, and the species of which are nearly all tropical.

The largest specimens are in a contracted state (in spirit) 6″ long, that is nearly as large as the largest specimens of *Holothuria tremula* Gunner. In a fully extended state (fig. 18) the body is rather elongated 4—5 times as long as

langstrakt, 4—5 Gange længere end bred, næsten overalt af ens Brede og i begge Ender stumpt tilrundet. Formen er imidlertid ikke som hos den egentlige Slægt Holothuria cylindrisk, men næsten prismatisk eller rettere firsidet, idet Rygsiden er stærkt hvælvet og steilt affaldende til hver Side, medens Bugsiden er ganske flad. Ryg og Bug ere overalt skarpt adskilte fra hinanden. Hvor nemlig disse støde sammen, ere Siderandene saavelsom den forreste og bageste Rand stærkt, næsten membranagtigt uddragne, hvorved fremkommer et Slags finneagtig Udbredning, der løber rundt det hele Legeme (se ogsaa Fig. 20 og 21), og som især i den forreste Del er meget tydelig. — Kroppen bærer 2 forskjellige Slags Ambulacralvedhæng, nemlig paa Ryggen lutter coniskt tilspidsede „Ambulacralpapiller“, paa Bugen derimod cylindriske, i Enden afstudsede „Ambulacralfødder.“ Ordningen af disse Vedhæng varierer noget hos de forskjellige Individer, men ere dog i sine Hovedtræk overensstemmende hos alle. Paa Ryggen bemærkes (Fig. 18, 19) 2 langs Siderne over de tvende dorsale Længdemuskler beliggende Længdestrøg (Ambulacrer) af temmelig store vorteformige Forhøininger, der danne 2 uordentlige Længderader i hvert Strøg. Disse Forhøininger ere i Enden mere eller mindre stærkt uddragne til coniskt tilspidsede Papiller, hvoraf altid nogle faa (Fig. 18 c c) (4—6 paa hver Side) ere betydeligt stærkere forlængede end de øvrige og indtil 7—8 Mm. lange. Langs ad Midten af Ryggen findes vistnok ogsaa nogle faa adspredte Ambulacralpapiller, men disse ere altid betydeligt mindre end de øvrige. En enkelt uafbrudt Rad af smalt tilspidsede Ambulacralpapiller (Fig. 18, 21 d) findes desuden langs Kroppens dorso-ventrale Rand).

Paa Bugsiden findes (Fig. 21) ingen „Ambulacralpapiller“, men blot „Ambulacralfødder“ eller Sugefødder *(e e)*, hvilke ere meget mindre end hine, simpelt cylindriske og paa Enden forsynede med en af en Kalkplade støttet Sugeskive (Fig. 26). De danne i Regelen her 2 Længdestrøg (Ambulacrer), et paa hver Side af Bugen over de laterale Længdemuskler, og i hvert Strøg dannende 3 eller 4, dog meget uordentlige Længderader. Paa Bugens Midte eller langs den der løbende uparrede Længdemuskel findes derimod hos de allerfleste Exemplarer ikke det mindste Spor af Ambulacralfødder, og hvor de ere tilstede her, ere de altid yderst faa i Antal, og ogsaa betydeligt mindre end de i de laterale Strøg. — Ved Længdemusklernes og Ambulacrernes Stilling er saaledes et Bivium og Trivium givet; det første indtager Ryggen, det sidste, hvis midterste Ambulacrum dog oftest fattes, indtager Bugen.

Munden (Fig. 21 o), som ligger ganske ventralt paa den nedre Side af den forreste Ende, er omgiven af en Kreds af 20 Tentakler (tt). Disse ere (Fig. 23) af en lignende Form som hos den egentlige Slægt Holothuria,

broad, nearly everywhere of the same breadth, and at both extremities obtusely rounded. The shape is however not cylindrical, as in the proper genus Holothuria, but nearly prismatic or more correctly four-sided; the back being strongly convex, with a steep incline to each side, while the belly is quite flat. Back and belly are everywhere sharply distinguished from each other. Where they meet, the lateral margins, as well the anterior as the posterior margin, are drawn out strongly almost like membranes, whereby a sort of fin-like enlargement is produced extending round the whole body (see also fig. 20 & 21) and especially distinct in the anterior part. — The body bears 2 different sorts of ambulacral appendages; namely, on the back only conically pointed “ambulacral papillæ“ but on the belly cylindrical “ambulacral feet“ truncated at the extremities. The arrangement of these appendages is somewhat various in different specimens; but in the main points it is similar in all. On the back there are (fig. 18, 19) 2 longitudinal streaks (ambulacra) situated along the sides and above the two dorsal longitudinal muscles, of rather large wart-like prominences which form 2 irregular longitudinal rows in each streak. These prominences are at the extremity more or less strongly drawn out in the form of conically pointed papillæ, of which always some few (fig. 18, cc, 4—6 on each side) are considerably more elongated than the others, and up to 7—8 Mm. long. Along the middle of the back there are certainly also some few scattered ambulacral papillæ; but these are always much smaller than the others. There is moreover a single unbroken row of small pointed ambulacral papillæ (fig. 18—21 d) along the dorso-ventral margin of the body (on the lateral margins, as well as on the anterior and posterior margins).

On the ventral side (fig. 21) there are no “ambulacral papillæ“, but only “ambulacral feet“ or suckers *(e e)* which are much smaller than the former, simply cylindrical, and provided at the extremity with a suction disc (fig. 26) strengthened by a calcareous plate. They usually form here 2 longitudinal streaks (ambulacra) one on each side of the belly above the lateral longitudinal muscles, and in each streak 3 or 4, but very irregular, longitudinal rows. But in the middle of the belly, or along the unpaired longitudinal muscle there situated, not the smallest trace of ambulacral feet is in most specimens to be found, and where such feet exist in this region, they are always extremely few in number, and also considerably smaller than in the lateral streaks. The position of the longitudinal muscles and the ambulacra establishes therefore a bivium and a trivium; the former occupies the back: the latter, of which the medial ambulacrum is however most frequently wanting, occupies the belly.

The mouth (fig. 21 o) which is situated quite ventrally on the lower side of the anterior extremity, is surrounded by a circle of 20 tentacles *(t t)*. These (fig 23) are in shape similar to those of the proper genus Holo-

idet de bestaa af en cylindrisk Stilk og en skjoldformig i en af smaa Grene bestaaende Skive udbredt Endedel, paa hvilken dog hos Spiritusexemplarer kunde adskilles 3 forskjellige Partier, 1 mediant og terminalt og 2 laterale nedad i hinanden overgaaende Partier (se Fig. 24 og 25). Paa Grund af den stærkt udviklede marginale Hudbræm paa Kroppen række Tentaklerne kun lidet eller slet ikke udenfor samme, hvorfor de, naar Dyret sees ovenfra (Fig. 18), blive fordetmeste ganske skjulte. *Anus* (Fig. 22 s) er beliggende paa den bageste Ende dorsalt eller et kort Stykke ovenfor Kroppens bageste Rand. Den er, naar den aabnes, cirkelrund med crenuleret Rand og er omgiven af 4 Par smaa coniske Ambulacralpapiller, hvoraf de 2 forreste Par ere beliggende ligeoverfor hinanden tæt foran, de 2 bageste tæt bag Analaabningen (se Fig. 22).

Hele Kroppen er saavel paa Bug- som Rygsiden uniformt kjødrød farvet, snart lysere, snart mørkere, undertiden gaaende over i det brunlige, samt temmelig gjennemsigtig, saa at de usædvanlig stærke Længdemuskler skinne tydeligt igjennem ligesom ogsaa delvis den med mørke contenta fyldte Tarmcanal. Tentaklerne ere ligeledes blegt kjødfarvede med noget stærkere (brunligt) farvet Endeskive.

Kroppens *Hud* er efter den forskjellige Grad af Contraction mere eller mindre tyk, stærk og tendinøs. Tvermusklerne ere af sædvanlig Beskaffenhed; derimod ere Længdemusklerne, af hvilke de tre ligge paa Bugsiden, de 2 øvrige paa Rygsiden meget stærke, brede og tykke (stærkere som det synes end hos vore øvrige Holothurider), især de 2 dorsale. Tarmcanalen forholder sig omtrent som hos Arterne af Slægten Holothuria, f. Ex. tremula. Svælgringen er derimod meget tyndere end hos denne sidste. Der er 2 lange Poliske Blærer paa Ringcanalen, af hvilke den ene maaske er Stencanalen. — Genitalrørene danne 2 Partier, et paa hver Side af Spiserøret; de ere meget talrige, tynde, traaddannede og temmelig forgrenede. — Respirationstræet er tvedelt, den høire længere Gren fæstet til Kroppens Væg og strækkende sig frem næsten til Svælgringen, den venstre kortere Gren fæstet til Tarmen; begges Endeblærer ere temmelig smaa.

Kalklegemerne i Kroppens Hud ere meget talrige, men langtfra ikke saa tætsiddende eller sammenhobede som hos H. tremula. De have (Fig. 27—29) Form af et mere eller mindre høit Taarn med flere Stokværk eller Etager, men dette Taarns Basis er ikke udviklet til en Skive, men har Form af et Kors, hvis 4 tynde Stave udvide sig i Enden, som er rundagtig og gjennemboret af 1—3 regelmæssigt stillede Huller. Hos et Individ var Korset (Fig. 31) forholdsvis større, d. e. de 4 Stave større, og hver af de udvidede Ender gjennemboret af 3 eller 5 Huller. Enkelte uudviklede Kalklegemer (Fig. 34) forekom ikke sjeldent, hvilke vare meget smaa og kun bestaaende af et simpelt Kors, hvor alle 4 Arme vare tilspidsede uden nogen Udvidning. Hos andre lidt større ere

thuria; as they consist of a cylindrical stalk, and a scutiform extremity enlarged like a disc made up of small branches, shewing however in spirit specimens 3 distinct parts; one medial and terminal, and 2 lateral parts going over into each other below (see fig. 24 and 25). On account of the strongly developed marginal rim of the skin, the tentacles extend only a little or not at all beyond it; and therefore when the animal is viewed from above (fig. 18) they are for the most part entirely hidden. The *Anus* (fig. 22 s) is situated at the posterior extremity, dorsally or a little above the posterior margin of the body. It is, when open, circular with a crenulated margin, and is surrounded by 4 pairs of small conical ambulacral papillæ, of which the 2 anterior pairs are situated opposite to each other close before, and the 2 posterior pairs close behind the anal aperture (see fig. 22).

The whole body, as well ventral side as dorsal, is uniformly of a flesh-red color, sometimes lighter sometimes darker, sometimes going over to a brownish color and rather transparent; so that the extraordinarily strong longitudinal muscles shine plainly through, as does also partially the intestinal canal filled with dark contents. The tentacles are likewise of a pale flesh-color with somewhat more strongly colored (brownish) terminal discs.

The *skin* of the body is according to its different degree of contraction more or less thick, strong and tendinous. The transverse muscles are of the usual nature; but the longitudinal muscles of which 3 are situated on the ventral side, and the 2 others on the dorsal side, are very strong broad and thick (stronger apparently than in the other Holothurians) especially the dorsal ones. The intestinal canal is nearly as in the species of the genus Holothuria, for instance H. tremula. The calcareous ring is however much thinner than in this latter. There are 2 long ambulacral vesicles on the circular canal; one of them is perhaps the stone canal. The genital tubes form 2 fascicles, one on each side of the æsophagus; they are very numerous, thin filiform, and rather ramified. The respiratory organ ("the lung-tree") is bipartite: the right longer branch attached to the wall of the body and extending forwards nearly to the æsophagal ring; the left shorter branch attached to the intestine; both the terminal vesicles are rather small.

The calcareous corpuscles in the skin of the body are very numerous, but not nearly so close-lying or so accumulated as in the H. tremula. They have (fig. 27—29) the shape of a more or less elevated tower with many stories or stages; but the base of this tower is not developed to a disc, but has the form of a cross with 4 thin bars enlarged at the extremity which is roundish and perforated with 1—3 regularly placed holes. In one specimen the cross (fig. 31) was proportionally larger i. e. the 4 bars were larger and each of the enlarged extremities was perforated with 3 or 5 holes. Some undeveloped calcareous corpuscles (fig. 34) appeared not unfrequently; these were very small and consisted only of a simple cross of which all the 4 arms were pointed without

Korsets Arme ikke tilspidsede, og deres Ende begynder at dele sig gaffelformigt eller voxe ud i 2 divergerende Spidser, hvilke derefter atter dele sig o. s. v., og idet tillige disse Grene ved ligeledes tynde Tverstave forene sig med hinanden, fremkommer saaledes den udvidede af store Huller gjennembrudte Ende af Korsets Arme. Sjeldent ere 2 af disse Arme forbundne med hinanden ved en bueformig Tverstav, eller 2 og 2 ligeover for hinanden staaende Arme paa denne Maade forenede (Fig. 32), og kun i et eller 2 Tilfælde blandt Hundreder af undersøgte Kalklegemer fandtes alle 4 Arme forbundne (Fig. 33) saaledes, at de dannede en Skive af et lignende Udseende som hos H. tremula, d. e., at den havde en cirkelrund Form med bølgeformig bugtet Peripheri og gjennemboret af 4 Huller i Midten, hvilke ere langt større end de øvrige ved Randen beliggende. Det viser sig, som man ser, hos nærværende Art meget tydeligt, at Korset, som allerede Düben og Koren rigtigt angive, er den først dannede Del af disse Kalklegemer, saaledes, at de 4 centrale Huller af deres Skive først danne sig derved, at de 4 Ender af Korset forbinde sig bueformigt med hinanden. Foruden ved den ringere Udvikling af selve „Skiven" er det dog fornemmelig ved dennes af Düben og Koren saakaldte Krone, at nærværende Form afviger betydeligt fra samme af H. tremula. Denne Krone (se Fig. 27, 28 og 29), som hæver sig lodret op fra Skivens Midte og dannes af 2, 3 eller i mest udviklet Tilstand af 4 Grene eller cylindriske Stave, hvorved den bliver firkantet, er nemlig meget høiere (fra ligesaa høi indtil, især i Huden af Ambulacralpapillerne (Fig. 28, 29), næsten dobbelt saa høi som Skivens Diameter) og tillige smalere end hos H. tremula, samt ikke som hos denne Art besat med Spidser eller Torne. Som en Følge af Kronens større Høide ere dens 4 Stave forenede med flere Bjelker eller Tverstave, end hos H. tremula, nemlig fra 3 til 5, og den hele Krone faar derfor stor Lighed med et gjennembrudt Taarn af flere Stokværk, ligesom den ogsaa foraarsager en liden, allerede ved Lupen synlig conisk Fremragning (Fig. 40, 41) af Overfladen af Huden, som den drager op med sig. Kalklegemerne hos H. tremula have derimod en betydeligt lavere og bredere Krone, som ogsaa er besat med flere Torne (se Düben og Koren's Afbildning i Øfversigt af Skand. Echinod. Tab. 4 Fig. 26, 27). Ambulacralpapillernes Hud indeholder foruden de beskrevne Kalklegemer med særdeles høi opstaaende Krone (Fig. 28, 29) desuden talrige, lange, cylindriske, i begge Ender noget afsmalnende og mere eller mindre bueformigt bøiede kalkagtige Tverstykker eller Naale (Fig. 35), hvis Overflade er besat med smaa coniske Knuder; imod Spidsen af Ambulacralpapillerne blive de stærkere bøiede, mindre og næsten glatte. Bugsidens Ambulacralfødder indeholde de samme Slags Tverstykker, kun endnu tættere pakkede paa hinanden og stærkere bueformigt bøiede (omtr. i en Halvcirkel) samt udenom dem, eller i det yderste Lag af Huden, spredte eller ikke meget talrige Kalklegemer som de ovenfor beskrevne (med korsdannet Skive og tornformig

any enlargement. In others rather larger, the arms of the cross are not pointed; and their extremity begins to divide itself fork-like, or to grow out in 2 diverging points which then again divide themselves, and so on; and as these branches at the same time connect themselves by similar thin cross bars, with each other, there is thus produced on the arm of the cross the enlarged end perforated with large holes. Rarely are 2 of these arms joined together by an arched transverse, or 2 and 2 opposite arms united in this manner (fig. 32); and only in 1 or 2 cases among hundreds of calcareous corpuscles examined, were all 4 arms found connected (fig. 33) so as to form a disc similar in appearance to those of H. tremula; i. e. with a circular shape, wavy sinuous periphery and perforated in the middle with 4 holes much larger than those near the margin. It appears very evidently in the present species that the cross, as Düben and Koren have already noticed correctly, is the first part formed of these calcareous corpuscles; so that the 4 central holes of the disc are first formed by the 4 arms of the cross becoming curved and attaching themselves to each other. It is not only by the smaller development of the "disc" itself, but chiefly by the crown of the disc (so-called by Düben and Koren) that the present form differs considerably from H. tremula. This crown (see fig. 27, 28 and 29) which rises perpendicularly from the middle of the disc, and is formed of 2, 3 or, in the most developed state, of 4 branches or cylindrical staves whereby it becomes foursided, is much higher in the S. natans, namely from equal in height to the diameter of the disc, up to double that diameter, in the skin of the ambulacral papillæ (fig. 28, 29) especially; it is also thinner than in the H. tremula and not as in the latter covered with points or thorns. As a consequence of the greater height of the crown, its 4 staves are joined by more beams or transverse staves than in the H. tremula, namely 3—5 whereby the whole crown acquires a great resemblance to a tower of several stories with perforated walls; and it likewise often occasions a small conical prominence (fig. 40—41) (visible through a magnifying-glass) in the surface of the skin which it pushes up. The calcareous corpuscles in the H. tremula have on the contrary a much lower and broader crown, which is also covered with many thorns (see Düben and Korens Afbildning i Öfversigt af Skand. Echinod. Tab. 4, fig. 26, 27). The skin of the Ambulacral papillæ contains, besides the calcareous corpuscles described with the remarkably high erect crown (fig. 28, 29), also numerous long cylindrical calcareous transverse pieces or needles (fig. 35). These are somewhat taper towards both extremities, and more or less curved; their surface is covered with small conical tubercles; towards the apex of the ambulacral papillæ, they are more strongly curved, smaller, and nearly smooth. The ambulacral feet of the ventral side contain the same sort of transverse pieces, only still more closely packed together and more strongly curved (nearly in a semicircle) and outside of these, or

Krone), kun endel mindre. Endelig er Endeskiven (Sugeskiven) støttet af et sammenhængende Kalknæt, der indtager hele dens Flade. Lignende Tverstykker som de i Ambulacralvedhængene findes ogsaa i Huden af Tentaklerne, i hvis grenede Endeflige de ligeledes blive stærkere bueformigt bøiede og meget smaa (Fig. 36).

Blandt de ved Lofoten indsamlede Exemplarer fandtes ogsaa en liden Unge (Fig. 37, 38) af denne Art. Den er i contraheret Tilstand (i Spiritus) 3 Mm. lang og overalt $1\frac{1}{2}$ Mm. bred, og hvidagtig gjennemsigtig uden Pigmentering. Antallet af Ambulacralpapiller og Ambulacralfødder var meget ringe. Paa hver Side af den stærkt hvælvede Ryg sees nemlig en Længderad af 4 eller 5 conisk-tilspidsede Ambulacralpapiller (Fig. 37, c c), der ere temmelig lange, især den forreste, som sidder helt fremme paa det forreste Hjørne og omtrent er $\frac{2}{3}$ Mm. lang; kun nogle faa, lidet tydelige og meget smaa findes spredte hist og her paa Ryggen. Paa den affladede Bug findes paa hver Side en enkelt Længderad Ambulacralfødder (Fig. 38 e e) (6 i den ene og 7 i den anden), der staa tættere sammen i den bageste Del af Kroppen, længere fra hinanden i den forreste Del, og desuden i den bageste Halvdel af Kroppen en Midtrad af 3 Ambulacralfødder (det midterste i Regelen manglende Ambulacrum af Trivium). Disse Fødder ere cylindriske med cirkelrund flad Endeskive. Munden sidder skraat paa Bugsiden af Kroppens forreste Ende og er omgiven af en Krands af kun 9 Tentakler (Fig. 38 t), af hvilke den ene, som sidder bagtil i Midten, er meget mindre end de øvrige 8, der alle ere omtrent lige store; deres udvidede, skjoldformigt-grenede Ende, som synes at være mindre delt end hos den voxne, er opak hvid. Tarmcanalen skinner ved dens mørke sortagtige Indhold klart igjennem den transparente Hud. — Kalklegemerne i Huden med deres langt over Hudens Overflade fremragende taarndannede Krone, som drager med sig Huden ud i en temmelig høi conisk Papille (Fig. 40, 41, a), ere ved Hudens fuldkomne Gjennemsigtighed særdeles iøinefaldende, især paa de store Ambulacralpapiller (se Fig. 40), og afgive et meget smukt mikroskopiskt Skue. De stemme fuldkommen overens med samme af det voxne Dyr og ere ogsaa allerede af samme Størrelse som hos dette.

Nærværende Form ligner, som man vil have seet, af vore nordiske Holothurider mest *Holothuria tremula* Gunnerus (H. elegans, O. Fr. Müller), fra hvilken den afviger ved den ved de stærkt uddragne dorso-ventrale Rande udprægede skarpere Adskillelse af Ryg- og Bugsiden, ved den ringere Udvikling af Skiven i Hudens Kalklegemer, og fornemmelig ved den fra disse sig hævende Krones betydeligere Høide, smalere Form og Mangel af Torne, endelig ogsaa ved Farven, der altid er uniform kjødrød

in the exterior layer of the skin, scattered, or not very numerous calcareous corpuscles, like those above described (with a cruciform disc and tower-like crown) only rather smaller. Finally the terminal disc (suction disc) is supported by a continuous calcareous net occupying the whole of its surface; similar transverse pieces to those of the ambulacral appendages are also found in the skin of the tentacles, in the ramified branched terminal lobe of which they are also more strongly curved and very small (fig. 36).

Among the specimens collected at Lofoten there was also found a quite young animal (fig. 37, 38) of this species. It is in a contracted state (in spirit) 3 Mm. long and everywhere $1\frac{1}{2}$ Mm. broad, and whitish-transparent without pigmentation. The number of the ambulacral papillæ and ambulacral feet was very small. On each side of the strongly convex back, there appears a longitudinal row of 4 or 5 conically pointed ambulacral papillæ (fig. 37, c c) which are rather long, especially the anterior one situated quite in front on the anterior corner and about $\frac{2}{3}$ Mm. long; only some few not very distinct and very small are found scattered here and there on the back. On the flattened belly there is on each side a single longitudinal row of ambulacral feet (fig. 38, e e) (6 in one row and 7 in the other) which are closer together in the posterior part of the body, and further from each other in the anterior part; and there is besides, in the posterior half of the body, a medial row of 3 ambulacral feet (the central usually wanting ambulacrum of the trivium). These feet are cylindrical with a circular flat terminal disc. The mouth is situated obliquely on the ventral side of the anterior extremity of the body, and is surrounded by a circle of only 9 tentacles (fig. 38, t) of which one, situated behind in the centre, is much smaller than the other 8 which are nearly similar to each other; their enlarged scutiform-ramified extremity, which appears to be less divided than in the adult specimens, is opaque white. The intestinal canal shines, with its dark blackish contents, distinctly through the transparent skin. The calcareous corpuscles in the skin with their tower-like crown projecting far above the surface, pushing out the skin into a rather high conical papilla (fig. 40, 41 a) are, by reason of the perfect transparence of the skin, strikingly remarkable, especially on the large ambulacral papillæ (see fig. 40) and afford a very beautiful microscopic spectacle. They agree completely with, and are also already of the same size as those of the adult animal.

The present form bears, as has been shown, a greater resemblance to the *Holothuria tremula* Gunnerus (H. elegans O. Fr. Müller) than to any other of our northern Holothurians; differing from it by the sharper distinction of back and belly marked by the strongly drawn out dorso-ventral margin, by the smaller development of the disc in the calcareous corpuscles of the skin, and chiefly by the greater height, thinner form, and smooth exterior of the towers which rise from the discs,

saavel paa Bug- som Rygside (hos H. tremula er Ryggen høirød, Bugen hvid). Derimod stemmer den ved den skarpe Adskillelse af Ryg- og Bugside overens med den middelhavske *H. regalis* Cuv., som ogsaa af Selenka (Zeitschrift f. wissensch. Zoologie 1867 p. 315) henføres til Slægten Stichopus. Denne Holothuride adskiller sig dog i flere Henseender fra vor nordiske Art, saasom ved dens okkergule Farve, de længere Ambulacralfødder langs ad Kroppens ventrale Rande, Kalklegemerne i Huden og Kalknaalene i Sugeføddernes Sider (se M. Sars, „Bidrag til Middelhavets Littoral-Fauna" i Nyt Magazin f. Naturv. 1857 p. 152, Tab. 2, Fig. 78—81). Den mærkværdigste Eiendommelighed ved vor nordiske Form er imidlertid dens Evne til ulig andre Holothurier at kunne udføre svømmende Bevægelser, hvorfra ogsaa Artsnavnet er hentet. Disse Bevægelser, som det nylig indfangede Dyr med kortere eller længere Mellemrum, i hvilke det ligger ganske stille, gjentager, aabenbart fordi det ikke befinder sig vel, ere meget energiske og ske ved en kraftig og jevn bølgeformig Bøining af Ryg- og Bugsiden i Form af et S op og nedad (se Fig. 20), næsten ligesom en Planarie eller Igle. Det formaar herved at hæve sig ikke blot fra Bunden af det med Sjøvand fyldte Kar, hvori man har det, men selv med den forreste Ende temmelig høit over Overfladen af Vandet; ja det først indfangede Exemplar bevægede sig endog saa stærkt i det Glas, hvori det var sat, at det blev nødvendigt at tildække dettes Aabning for at hindre det fra at slippe ud. Et andet Exemplar lykkedes ved disse bugtende Bevægelser at slippe ud af Bundskraben, netop som denne skulde tages ind i Baaden.

Som ovenfor anført forekommer denne mærkelige Holothuride som det synes temmelig hyppig ved Lofoten (ved Fiskeværet Skraaven), men aldrig her før i en Dybde af 200 Favne, hvorimod den gaar ned til de største her forekommende Dybder, 300—400 Favne. Den forekommer imidlertid ogsaa paa en langt sydligere Lokalitet, nemlig i Hardangerfjorden, hvor ogsaa Danielssen har fundet den, og gaar her (ved Mosterhavn) op til 120 Favne. Endelig har jeg engang for lang Tid siden ved Toskø i Nærheden af Manger fundet en Holothuride paa 200—250 F. D., som ifølge den af mig dengang udførte Tegning ganske bestemt henhørte til samme Art.

Nærværende Art er, som man ser, en decideret Dybvandsform, der rimeligvis forekommer langs vor hele Kyst, hvor Dybden er tilstrækkelig.

Den vil kunne kjendes ved følgende Diagnose:

Stichopus natans M. Sars.

Corpus elongatum, undiqve pallide carneum, subpellucidum, dorso convexo papillis ambulacralibus rarioribus elongato-conicis obtecto, series externas utrinqve 2 longitudinales irregulares formantibus, aliis multo minoribus subsparsis in medio dorsi sitis; margine circumcirca

finally also by the color which is always uniformly flesh red as well on the back as on the belly (in H. tremula the back is scarlet, and the belly white). On the other hand it resembles in respect of the sharp distinction between back and belly, the mediterranean *H. regalis* Cuv. which is also referred to the genus Stichopus by Selenka (Zeitschrift f. wissensch. Zoologie 1867, p. 315). This Holothurian distinguishes itself however in many respects from our northern species; as for instance by its ochre-yellow color; the longer ambulacral feet along the ventral margin of the body; the form of the calcareous corpuscles in the skin, and the calcareous needles in the sides of the ambulacral suckers (see M. Sars „Bidrag til Middelhavets Littoral Fauna" i Nyt Magasin f. Naturv. 1857, p. 152, Tab. 2, fig. 78—81). The most remarkable peculiarity in our northern form is however its faculty of executing swimming movements (unlike other Holothurians) which suggested its specific name. These movements, which the recently captured animal — with longer or shorter intervals during which it lies quite still — repeats evidently because it is not comfortable, are very energetic and are effected by a powerful and even undulation of the dorsal and ventral side in the form of an *S* upwards and downwards (see fig. 20) nearly like that of a planaria or a leech. It is by this means enabled not only to raise itself from the bottom of a vessel filled with sea water, but even to raise the anterior part of the body rather high above the surface of the water; nay the first specimen captured moved so strongly in the glass in which it was placed, that the mouth of the vessel had to be covered in order to prevent the animal from escaping. Another specimen managed by means of these undulating movements to escape out of the dredge just as it was about to be taken into the boat.

As above mentioned, this remarkable Holothurian occurs apparently rather frequently at Lofoten (at the fishing place Skraaven) but not at a less depth than 200 fathoms, while it descends to the greatest depths found there 300—400 fathoms. It occurs however also in a much more southern locality, namely in the Hardangerfjord, where Danielssen also has found it, and goes here (at Mosterhavn) up to 120 fathoms. Finally I have once a long time ago found at Toskö in the vicinity af Manger a Holothurian at the depth of 200 – 250 fathoms, which, according to the drawing made by me at the time, certainly belonged to the same species.

The present species is evidently a decided deep-water form, which is probably to be found along our whole coast where the depth is sufficient.

It may be known by the following diagnosis:

Stichopus natans, M. Sars.

Corpus elongatum undique pallide carneum subpellucidum, dorso convexo papillis ambulacralibus rarioribus elongato-conicis obtecto, series externas utrinque 2 longitudinales irregulares formantibus, aliis multo minoribus subsparsis in medio dorsi sitis; margine circumcirca

dorsum a ventre separante (margine dorso-ventrali) applanato, fere membranaceo et serie continua papillarum ambulacralium breviorum anguste-conicarum ornato; ventre plano pedibus ambulacralibus numerosis tenuibus, cylindricis, apice truncatis, in serie laterali utrinqve dispositis, medio pedibus sæpissime omnino destituto, raro singulis sparsis medianis ornato. Os inferum tentaculis 20 cylindricis, apice peltato-divisis, carneis circumdatum; anus subdorsalis. Corpuscula calcarea cutis tenera, disco crucis instar formato, cujus apices dilatati et foraminibus 3—5 perforati rarissime trabeculis arcuatis inter se conjuncti sunt, et ita, velut in Holothuria tremula, laminam subcircularem angulatam formantes. E medio crucis surgit corona verticalis qvadrangularis seu e ramis 4 (rarius 3 aut 2) constans trabeculis transversalibus 3—5 junctis, altissima (altitudine diametrum laminæ æqvante aut fere duplo superante), in superficie cutis valde prominens (elevata), angusta, non spinulosa. Corpuscula Cformia (ut in aliis speciebus hujus generis) nulla. In cute pedum papillarumqve ambulacralium nec non tentaculorum aciculæ calcareæ, densissime accumulatæ, transversales, longæ, cylindricæ, utrinqve angustatæ, curvatæ, tuberculis minutis conicis obsitæ.

Longitudo majorum 6 pollicaris.

Habitat ad insulas Lofotenses, profunditate 250—300 orgyarum, nec non ad Manger et in sinu Hardangerfjord prof. 120—300 orgyarum.

FORKLARING AF FIGURERNE.

Pl. 7, Fig. 18, forestiller *Stichopus natans* i omtrent den halve naturlige Størrelse, seet ovenfra, Tegningen udført efter et levende Exemplar; *a* den forreste, *b* den bageste Ende af Kroppen; *c c* de stærkt forlængede dorsale Ambulacralpapiller; *d d* Ambulacralpapillerne langs den dorsoventrale Rand.

Fig. 20. Samme seet fra Siden i den eiendommelige S formigt bugtede Stilling, som Dyret antager under sine svømmende Bevægelser; *o* Munden; de øvrige Bogstaver som paa Fig. 18.

Fig. 19. Et andet Fxemplar noget contraheret saaledes som det bliver efter i nogen Tid at have været opbevaret paa Spiritus, seet ovenfra. Bogstaverne som paa Fig. 18.

Fig. 21. Den forreste Del af Kroppen af et levende Exemplar, lidt forstørret, seet nedenfra; *d d* de marginale Ambulacralpapiller; *e e* Ambulacralfødderne (Sugefødderne); *o* Munden; *t t* de udstrakte Tentakler.

Fig 22. Deu bageste Ende af Kroppen, seet ovenfra; *c* dorsale Ambulacralpapiller; *d* marginale Ambulacralpapiller; *s* Anus omgiven af 4 Par smaa Ambulacralpapiller.

Fig. 23. En Tentakel isoleret, seet fra den ventrale Side.

Fig. 24. Enden af en Tentakel contraheret (efter et Spiritusexemplar), fra den ventrale Side.

Fig. 25. Samme fra den dorsale Side.

Fig. 26. En Sugefod isoleret.

Fig. 27, 28, 29. Kalklegemer af den dorsale Hud med korsformig Basaldel og mere eller mindre stærk udviklet Krone.

Fig. 30. Kronen af et Kalklegeme, paa hvilken 3 af de 4 Kronen sammensættende Længdestave ere synlige tilligemed de disse forbindende Tværbjelker.

Fig. 31. Basaldelen af et Kalklegeme hos et andet Individ, paa hvilken Korsets Arme ere usædvanligt stærkt forlængede

dorsum a ventre separante (margine dorso-ventrali) applanato, fere membranaceo et serie continua papillarum ambulacralium breviorum anguste-conicarum ornato; ventre plano pedibus ambulacralibus numerosis tenuibus cylindricis, apice truncatis in serie laterali utrinque dispositis, medio pedibus sæpissime omnino destituto, raro singulis sparsis medianis ornato. Os inferum tentaculis 20 cylindricis apice peltato-divisis carneis circumdatum; anus subdorsalis corpuscula calcarea cutis tenera, disco crucis instarformato, cujus apices dilatati et foraminibus 3—5 perforati rarissime trabeculis arcuatis inter se conjuncti sunt, et ita velut in Holothuria tremula laminem subcircularem angulatam formantes. E medio crucis surgit corona verticalis qudrangularis seu e ramis 4 (rarius 3 aut 2) constans trabeculis transversalibus — 3—5 junctis altissima (altitudine diametrum laminæ æquante ant fere duplo superante) in superficie cutis valde prominens (elevata) angusta non spinulosa. Corpuscula Cformia (ut in aliis speciebus hujus generis) nulla. In cute pedum papillarumque ambulacralium nec non tentaculorum aciculæ calcareæ densissime accumulatæ transversales longæ cylindricæ utrinque augustatæ curvatæ tuberculis minutis conicis obsitæ.

Longitudo majorum 6 pollicaris.

Habitat ad insulas Lofotenses profunditate 240—300 orgyarum nec non ad Manger et in sinu Hardangerfjord prof. 120—300 orgyarum.

EXPLANATION OF THE FIGURES.

Pl. 7, fig. 18 represents *Stichopus natans* about half the natural size viewed from above; the drawing executed from a living specimen. *a* the anterior, *b* the posterior extremity of the body; *c c* the strongly elongated dorsal ambulacral papillæ; *d d* the ambulacral papillæ along the dorso-ventral margin; *e* the ambulacral suckers.

Fig. 20. The same seen from the side in the peculiar S-like curved attitude which the animal assumes in its swimming movements. *o* the mouth; the other letters as in fig. 18.

Fig. 19. Another specimen somewhat contracted, as it becomes after having been kept some time in spirit, seen from above. The letters as in Fig. 18.

Fig. 21. The anterior part of the body of a living specimen slightly magnified seen from below. *d d* the marginal ambulacral papillæ; *e e* the ambulacral feet (suction feet); *o* the mouth; *t t* the extended tentacles.

Fig. 22. The posterior extremity of the body seen from above. *c* dorsal ambulacral papillæ; *d* marginal ambulacral papillæ; *s* the anus surrounded by 4 pairs of small ambulacral papillæ.

Fig. 23. A tentacle isolated seen from the ventral side.

Fig 24. The extremity of a tentacle contracted (from a spirit specimen) from the ventral side.

Fig. 25. The same from the dorsal side.

Fig. 26. A sucker isolated.

Fig. 27, 28, 29. Calcareous corpuscles from the dorsal skin with cruciform base and more or less strongly developed crown.

Fig. 30. The crown of a calcareous corpuscle in which 3 of the 4 longitudinal staves that compose the crown are visible together with the transverse beams that connect them.

Fig. 31. The basal part of a calcareous corpuscle, from another specimen, in which the arms of the cross are unusually

og i Enden gjennemboret af et større Antal Huller end sædvanligt.

Fig. 32. Basaldelen af et andet Kalklegeme, paa hvilken 2 og 2 ligeoverfor hinanden staaende Arme af Korset ere forenede ved en bueformig Tværstav.

Fig. 33. Basaldelen af et andet Kalklegeme, paa hvilken det sjeldne Tilfælde er indtraadt, at alle Korsets Arme ere indbyrdes forenede med hinanden, saa at den faar Udseendet af en cirkelrund, af 4 store centrale og talrige peripheriske Huller gjennembrudt Skive.

Fig. 34. Ufuldstændigt udviklet Kalklegeme, kun bestaaende af et simpelt Kors med tilspidsede Arme.

Fig. 35. Kalknaale i Huden af de dorsale Ambulacralpapiller.

Fig. 36. Kalknaale i Huden af Tentaklerne.

Fig. 37. En ganske liden Unge forstørret, seet fra Rygsiden. *a* den forreste, *b* den bageste Ende af Kroppen; *c c* dorsale Ambulacralpapiller.

Fig. 38. Samme seet fra Bugsiden. *e e* Sugefødder; *t* Tentakler; *b, c* som paa Fig. 37.

Fig. 39. Den forreste Ende af Kroppen seet forfra og noget nedenfra. *c c* det forreste Par særdeles store dorsale Ambulacralpapiller; *e e* Sugefødder; *o* Munden; *t t* Tentaklerne.

Fig. 40. En af de forreste dorsale Ambulacralpapiller af samme Unge, stærkere forstørret, med de talrige i Huden af samme liggende Kalklegemer, hvis Kroner drage Huden ud med sig i coniske Papiller.

Fig. 41. Fn af disse Hudpapiller, stærkt forstørret, tilligemed det indenfor liggende Kalklegeme.

PTERASTER MULTIPES, M. Sars.

n. sp.

(Pl. 8, Fig. 1—17).

Pteraster multipes, M. Sars, Om arktiske Dyreformer i Christianiafjorden. Vid. Selsk. Forh. f. 1865, p. 200.

Denne mærkelige Søstjerne. som jeg fandt 1864 i et eneste Exemplar ved Drøbak paa 60 Favnes Dyb, har i Almindelighed den største Lighed med den i min „Oversigt af Norges Echinodermer“ beskrevne *P. pulvillus*. Ligesom denne har den (se Tab. 8, Fig. 1, 2) en pentagonal Form, idet dens 5 Arme ere meget korte, saa at Skivens Radius forholder sig til Armenes Radius omtrent som 1 : 1½; dog er Ryggen mindre stærkt hvælvet, da det iagttagne Individ havde et Tværmaal (fra den ene til den anden ligeoverfor staaende Armspids) af 3″, men en Høide af kun 1″. — Dens Farve er ogsaa lignende paa Rygsiden, som er smudsig brungul eller lys leverbrun med graahvide Randbræmme; den bløde ydre Ryghud er ligeledes næsten ugjennemsigtig eller kun meget lidet transparent, temmelig stærkt rynket og besat saavel paa Skiven som Armene med talrige smaa coniske Vorter (Fig. 2, a). Disse staa imidlertid mere regelmæssigt end hos P. pulvillus, idet de danne skraa Rader eller ere stillede i Qvincunx, hvilket som vi nedenfor skulle faa at se, har sin Grund deri, at de i Ryggens Kalkskelet indplantede Paxiller have paa sin Top i Midten en Kalknaal, som er større og tykkere end de øvrige, der omgive den, og hvis fremragende Ende bevirker de omtalte coniske Vorter eller Fremragninger af den ydre Ryghud. Hos P. pulvillus, hvis Paxiller ere

elongated and perforated at the extremities with a greater number of holes than usual.

Fig. 32. The basal part of another calcareous corpuscle, in which 2 and 2 of the opposite arms of the cross are united by a curved transverse bar.

Fig. 33. The basal part of another calcareous corpuscle, in which the rare occurrence has taken place that all the arms of the cross are united with each other; so that it has the appearance of a circular disc perforated with 4 large central, and numerous peripheral holes.

Fig. 34. Imperfectly developed calcareous corpuscles only consisting of a simple cross with pointed arms.

Fig. 35. Calcareous needles in the skin of the dorsal ambulacral papillæ.

Fig. 36. Calcareous needles in the skin of the tentacles.

Fig. 37. A very small young animal, magnified, viewed from the dorsal side. *a* the anterior, *b* the posterior end of the body; *c c* dorsal ambulacral papillæ.

Fig. 38. The same viewed from the ventral side. *e e* suction feet; *t* tentacles; *b, c* as in fig. 37.

Fig. 39. The anterior extremity of the body viewed from in front and somewhat from below. *c c* the anterior pair of remarkably large dorsal ambulacral papillæ; *e e* suction feet; *o* the mouth; *t t* the tentacles.

Fig. 40. One of the anterior dorsal ambulacral papillæ of the same young animal more strongly magnified, with the numerous calcareous corpuscles in the skin; the crowns raising the skin in conical papillæ.

Fig. 41. One of these skin papillæ strongly magnified with the calcareous corpuscle lying inside.

PTERASTER MULTIPES. M. Sars.

n. sp.

(Pl. 8, fig. 1—17.

Pteraster multipes, M. Sars. Om arktiske Dyreformer i Christianiafjorden. Vid. Selsk. Forh. f. 1865, p. 200.

This remarkable star-fish, of which I found in 1864 a single specimen at Dröbak in 60 fathoms water, has generally the greatest resemblance to the *P. pulvillus* described in my „Oversigt af Norges Echinodermer“. Like the P. pulvillus it has (see Tab. 8, fig. 1, 2) a pentagonal form, while its 5 arms are very short; so that the radius of the disc is in proportion to the radius of the arms about as 1 : 1½; but the back is less convex; the specimen observed having a transverse diameter from the point of one arm to the point of the opposite arm of 3″, with a height of only 1″. Its color is also similar on the dorsal side, which is of a dirty brownish yellow, or a light liver-brown with grey-white marginal rims; the soft exterior dorsal skin is likewise almost opaque or very slightly transparent, rather strongly corrugated and covered, as well on the disk as on the arms, with numerous small conical warts (fig. 2, a). These are however more regularly situated than in the P. pulvillus, as they form oblique rows or are placed in quincunx, which as we shall presently have occasion to see, is caused by the paxillæ planted in the calcareous skeleton of the back having on their summit in the centre a calcareous needle larger and thicker than the others around it; so that its prominent extremity produces the above-mentioned conical

kronede med ligestore Kalknaale, ere hine Fremragninger baade af en mere uregelmæssig conisk Form og temmelig uregelmæssigt spredte. *Bugsiden,* som hos P. pulvillus er ensfarvet lys gulgraa, er hos den nye Art *lys gulagtig, næsten gulhvid, med talrige livlig rødgule eller orangerøde Linier,* der løbe parallele med hinanden fra Tværfinnerne udad til Randen af Skiven og Armene. Disse Linier (Fig. 1, e) ere egentlig tynde liniedannede ophøiede Hudfolder, Fortsættelser af de paa begge Sider af Bugfurerne siddende Tværfinner og svare følgelig i Antal til disse. Paa den opad bøiede Spids af Armene sidder, ligesom hos P. militaris og P. pulvillus, en stærkt iøinefaldende blodrød Øieplet (Fig. 2, k). — *Sugefødderne* endelig (*c*), hvilke hos hine tvende Arter ere hvide eller gulgraa, ere her *smukt fiolette med snehvid Sugeskive,* hvilken ligesom hos hine er svampdannet eller lidt bredere end selve Sugefoden; imod Armspidsen blive Sugefødderne blegere, og de alleryderste ere næsten farveløse.

Saameget vor Søstjerne end ved første Øiekast, naar den sees fra Rygsiden, ligner P. pulvillus, saa forskjellig viser den sig ved den nærmere Undersøgelse af dens Bugside (Fig. 1). Bug- eller Ambulacralfurerne ere nemlig paafaldende brede i Forhold til samme hos de 2 andre Arter, og de deri staaende *Sugefødder (c c) baade større og langt talrigere,* og ved nøiere Eftersyn viste sig den overraskende Kjendsgjerning, at de i hver Straale ikke, som hos hine, danne 2, men *4 Rader* ligesom i Asteracanthiadernes Familie. Kun inderst ved Munden er der i de 2 sidste Tværrader kun 3 Sugefødder, ligesaa ved den yderste Ende af Armene, hvor de som sædvanlig ere mindre udviklede, kortere og tyndere, 3 og tilsidst kun 2 i en Tværrad. I Længderetning danne Sugefødderne 4 lige, i Tværretning lidt skraa Rækker. I hver Længderad af en Straale taltes 41 Sugefødder. Der er saaledes, med Fradrag af de inderst ved Munden og yderst ved Armspidsen manglende, omtrent *150 Sugefødder* i hver af de 5 Straaler — et ualmindeligt Antal af tilmed store Sugefødder i en saa kort (kun $1^1/_2$" lang) Straale. Hos 2 af de største Exemplarer (det ene $2^1/_2$", det andet $2^1/_8$" i Tværmaal) af P. pulvillus taltes derimod kun respective 72 og 68 Sugefødder i hver Straale, altsaa omtrent Halvdelen af Antallet hos nærværende Art, og hos det største (3" i Tværmaal) af mine Exemplarer af P. militaris, en Art, som er udmærket ved længere Arme ($^1/_2$ Gang længere end hos de 2 andre Arter) taltes i hver Straale kun 98 Sugefødder.

De paa Adambulacralpladerne til begge Sider af Bugfurerne siddende *Tværfinner* (Fig. 2, d) ere saa talrige og tæt sammentrængte og deres frie Rand derhos saa mangfoldig foldet, at de kun vanskelig kunne tælles. Man overbeviser sig imidlertid snart om, at *deres Antal svarer til Suge-*

warts or prominences of the outer dorsal skin. In the P. pulvillus, the paxillæ of which are crowned with calcareous needles of equal size, those prominences are both of a more irregularly conical form, and rather irregularly distributed. The ventral side, which in P. pulvillus is uniformly light yellow-grey, is in the new species *light yellowish, almost yellowish white, with numerous bright reddish yellow or orange-red lines* running parallel to each other from the transverse fins outwards to the margin of the disc and the arms. These lines (fig. 1, e) are properly thin linear raised folds of the skin, continuations of the transverse fins situated on both sides of the ventral furrows, and correspond consequently in number to these fins. On the upward bent point of the arms there is situated, as in P. militaris and P. pulvillus a strikingly remarkable blood red eye-spot (fig. 2, k). And finally the water-feet, (*c*) which in the two other species are white or yellowish-grey, are here of a *beautiful violet color with snow-white suckers* which, as in the other species are sponge-shaped or a little broader than the water-foot itself; towards the point of the arm, the water-feet are paler; and those at the extremity are nearly colorless.

Much as our star-fish, when viewed from the dorsal side, appears at first glance to resemble P. pulvillus, it shews itself, on closer examination of the ventral side, (fig. 1) to be very different from that species. The ventral or ambulacral furrows are remarkably wide as compared with those in the two other species, and the *water-feet therein (c c) are both larger and much more numerous;* and on closer inspection the surprising fact was ascertained that in each ray they do not as in the other species form 2, but 4 rows as in the family of the Asteracanthiadæ. Only at the innermost part near the mouth, there are in the two last transverse rows only 3 water feet, and at the extreme end of the arm, where they as usual are less developed, shorter and thinner, 3 and at last only 2 in a transverse row. In the longitudinal direction the water-feet form 4 straight series, slightly oblique transversely. In each longitudinal row of a ray there were counted 41 water-feet. There are thus, exclusively of those wanting at the innermost part near the mouth and at the outermost points of the arms, about *150 water-feet* in each of the 5 rays; an unusual number, (and moreover large water-feet) in a so short (only $1^1/_2$") ray. In 2 of the largest specimens (one $2^1/_2$" and the other $2^1/_8$" in diameter) of P. pulvillus, there were counted respectively only 72 and 68 water-feet in each ray, that is about half of the number in the present species; and in the largest (3" diameter) of my specimens of P. militaris, a species distinguished by longer arms ($^1/_2$ as long again as in the other 2 species) there were counted in each ray only 98 water-feet.

The *transverse fins* (fig. 2, d) on the adambulacral plates on both sides of the ventral fins, are so numerous and so close together, and their free margin moreover so intricately folded that they cannot easily be counted. It can however soon be ascertained that *their number cor-*

føddernes, altsaa udgjør omtrent 75 paa hver Side af Bugfuren (hos P. pulvillus kun 34—38 paa hver Side af Bugfuren). *Hver anden af dem* (Fig. 9, d) er nemlig kortere og strækker sig indad til en Sugefod af den ydre Rad (*a*), *hver anden er noget længere* (*c*) (hos de 2 andre Arter ere alle hinanden nærstaaende af samme Længde, medens de som sædvanlig efterhaanden imod Armspidsen blive kortere) og løber mellem 2 Sugefødder af den ydre Rad ind til en Sugefod af den indre Rad (*b*), og saaledes bestandigt afvexlende. Der er i de længere Tværfinner (Fig. 10, 11) 5 Pigge (*c*), hvilke indenfra udad tiltage noget i Længde; i de kortere (Fig. 13) er der ligeledes 5, men den inderste af dem bliver pludselig meget liden, omtrent 3 Gange kortere og tyndere end den nærmeste og er stillet udenfor eller paa den aborale Side af denne, medens samtlige øvrige danne en næsten lige Tværrad. Alle disse Pigge ere naaleformige, temmelig stærke, tilspidsede i Enden og med deres tykkere Basis bevægeligt indleddede paa en liden rund Knude, og samtlige forbundne ved en mellem dem udspændt *tynd Hud, som over Enden af Piggene gaar ud i høit fremragende eller temmelig lange fortykkede eller kjødede Lappe* (*d*) *af tunge- eller lancetdannet Form, hvis Rand er uregelmæssigt bugtet og foldet.* Den forbindende Hud fortsætter sig i de ovenfor omtalte lave, liniedannede, udad paa Bræmmen lige til dens Rand løbende parallele Hudfolder. Hos P. pulvillus er der i Tværfinnerne (se Fig. 19), med Undtagelse af de nær ved Armens Spids staaende, almindelig 6 Pigge, sjeldnere inderst en meget liden syvende, af hvilke den inderste (*a*) (eller naar der er 7 de 2 inderste) er kortest, den anden (eller tredie) er længst, de øvrige lidt kortere, og den dem forbindende Hud er i Randen temmelig stærkt bueformig indskaaren mellem Piggene, og disses Endespids overrages kun lidet af Huden, som her er noget fortykket og danner en tilrundet eller kort-tungeformig Lap (*d*) for hver Pig. Hos P. militaris er der i Tværfinnerne (Fig. 20) ligeledes almindelig 6 Pigge, af hvilke den inderste (*a*) er mindst, de øvrige omtrent lige lange og den forbindende Hud er svagt (mindre stærkt end hos P. pulvillus) bueformig indskaaren mellem Piggene og overrager ikke disse, saa at de ikke fortykkede Lappe over Piggenes Ende blive triangulært tilspidsede (*d*).

Den inderst ved Munden staaende Tværfinne (Fig. 14, m) er, ligesom hos P. pulvillus, forvoxen med den tilsvarende fra den nærmest ved beliggende Bugfure til en eneste, som derved faar Form af en Vifte og danner en af de 5 Mundvinkler. Denne Vifte (*o*) bestaar af 10 ved Hud forbundne Pigge, nemlig 5 (i ét Tilfælde fandtes i den ene 6) i hver af de med hinanden forvoxne Tværfinner, hvilke Pigge danne en bueformig Rad paa den inderste eller imod Munden vendte Rand af de 2 inderste Adambulacralplader, paa hvilke de sidde. Disse Plader ere ligesom hos de 2 andre Arter mere udviklede end de øvrige Adam-

responds to that of the water-feet and amounts therefore to about 75 on each side of the ventral furrow (in the P. pulvillus only 34—38 on each side of the ventral furrow). *Every alternate one of them* (fig. 9, d) is shorter, and extends inwards to a water-foot of the outer series *(a)*; and *every other somewhat longer (c)* (in the 2 other species they are situated close together and of the same length becoming only gradually shorter towards the points of the arms) running between 2 suction-feet of the exterior series inwards to a suction foot of the interior series *(b)*; and so on continually alternating. There are in the longer transverse fins (fig. 10, 11) 5 spines *(c)*, which from within outwards increase somewhat in length; in the shorter fins (fig. 13) there are also 5; but the innermost of these becomes suddenly very small, about $^1/_3$ of the length of that next to it, and thinner, being also situated somewhat more in front or on the aboral side, while all the other spines form a nearly straight transverse row. All these spines are needle-shaped, rather strong and pointed at the extremity, with their thicker base movably articulated on a small round tubercle; and all of them connected by a *thin membrane*, stretched between them, *terminating over the ends of the spines in a high prominent or rather long swollen or fleshy tongue-shaped or lancet-shaped lobe (d) the margin of which is irregularly bent and folded.* The connecting membrane is continued in the previously mentioned low linear parallel skin folds running out on the border even to its edge. In P. pulvillus there are in the transverse fins (see fig. 19), with exception of those near the points of the arms, usually 6 spines, (rarely innermost a very small seventh) of which the innermost *(a)*, or where there are 7 the 2 innermost) shortest; the second (or third) longest, and the others a little shorter; and the connecting membrane is at the margin rather strongly incurved between the spines; the terminal points being only a little overlapped by the skin, which is here somewhat thickened, and forms a rounded or shortly-tongue-shaped lobe *(d)* for each spine. In the P. militaris there are in the transverse fins (fig. 20) likewise usually 6 spines, of which the innermost *(a)* is smallest; the others about equally long, and the connecting membrane is slightly (less strongly than in the P. pulvillus) incurved between the spines and does not overlap them; so that the lobes over the extremities of the spines are not thickened, but terminate in points *(d)*.

The transverse fin situated innermost near the mouth (fig. 14, m) is as in P. pulvillus connate with the corresponding fin from the nearest ventral ambulacrum, so as to form one fin in the form of a fan, and occupies one of the 5 bucal angles. This fan *(o)* consists of 10 spines connected by a membrane; namely 5 (in one case there were found 6 in one) in each of the connate transverse fins, the spines of which form a curved row from the innermost border (that nearest the mouth) of the 2 interior adambulacral plates on which they are situated. These plates are, as in the 2 other species, more developed

bulacralplader, idet de ere omtrent dobbelt saa store og, istedetfor som de sidste at være transversale eller langstrakt — rectangulære, have de antaget en noget nær triangulær Form. Begge Plader ligge ganske tæt til hinanden og ere bevægeligt forbundne med deres imod hinanden vendte Rand, som er lige og fint tandet. Midt paa deres frie eller nedre Flade sidder paa hver af dem en af Lütken først hos P. militaris og senere af mig hos P. pulvillus bemærket Pig (*n*), som her neppe er saa stor som de største i Viften staaende (hos P. pulvillus er den oftest større end disse).

Endelig bemærkes, at hver anden af Adambulacralpladerne (Fig. 15, f), den nemlig, som bærer en længere Tværfinne, rager lidt længere frem i Bugfuren end hver anden (*e*), som bærer en kortere Tværfinne.

Brœmmen langs Skivens og Armenes Rand (Fig. 2, i) er her tykkere, mere kjødagtig end hos de 2 andre Arter, saa at de i den indsluttede *store Randpigge,* hvilke ligeledes i Antal svare til Tværfinnerne, først komme tilsyne ved Indtørring. Disse Randpigge (Fig. 11, 13, Fig. 14, 15, h) ere insererede næsten i lige Linie med Tværfinnerne og i kort Afstand fra disses yderste Pig, paa en noget fremragende Del af Adambulacralpladens ydre Rand, og ere ligesom hos hine 2 Arter tykkere og længere end Tværfinnernes Pigge (midt paa Armene næsten dobbelt saa lange). — Tæt foran og indenfor hver Randpigs Basis, eller nær ved den Adambulacralpladerne adskillende Tværfure, altsaa afvexlende med Tværfinnerne, ligger, ligeledes indsluttet i Huden, den af mig hos de 2 andre Arter beskrevne *lille Randpig* (Fig. 15, i), der har den samme lidt bøiede lancetdannede Form som hos vore 2 andre norske Arter (se Fig. 18, 21, i).

Ogsaa Rygsiden af vor Søstjerne frembyder ved nærmere Undersøgelse nogle Afvigelser fra P. pulvillus. *Hulrummet mellem begge Ryggens Huder,* hvilket, som vi vide fra P. militaris, er en Klækkehule eller Marsupium og tillige en Respirationshule, der lignende et af Pillarer støttet Felt indtager den hele Rygside, *er nemlig her betydeligt større end hos de 2 andre Arter* og, naar man gjennemskjærer en Straale tværsover Midten af dens Længde, viser det sig at være næsten ligesaa høit som Kroppens eller Indvoldehulen (se Fig. 2). Som Følge heraf ere de i Ryggens netformige (af den indre Ryghud beklædte) Kalkskelet indplantede *Paxiller eller Pigkoste* (Fig. 3, d, Fig. 5) *forholdsvis større.* Dette gjælder især om deres Skaft, som paa Skiveryggen (imod Armenes Ende blive Paxillerne som bekjendt overalt efterhaanden mindre) er indtil 4 Mm. høit (hos et ikke betydeligt mindre Exemplar af P. pulvillus knapt 2 Mm.) og $^2/_3$ Mm. tykt; dets Top er i Omkredsen kronet med en Krands af 8—11 tynde Naale og i Centrum af *1* (*undertiden 2*) *længere og betydeligt* (*2—4 Gange*) *tykkere Naal* (*f*), som rager langt ud over hine og foraarsager ved med sin Ende at støde op imod Underfladen af den ydre Ryghud en liden conisk Vorte eller

than the other adambulacral plates, being about twice as large; and instead of being like the others transversally or longitudinally oblong-rectangular, they have assumed a nearly triangular form. Both plates lie quite close to each other, and are movably connected by their contiguous margins, which are straight and finely dentated. In the middle of their free or lower surface, there is on each of them a spine *(n)* which was first remarked by Lütken in P. militaris, and afterwards by me in P. pulvillus. This spine is here scarcely so large as the largest in the fan (in P. pulvillus it is most frequently larger).

Finally we remark that every alternate one of the adambulacral plates (fig. 15, f), namely that one which bears a longer transverse fin, projects a little further in the ventral furrow than every other *(e)* which bears a shorter transverse fin.

The Rim along the margin of the disc and of the arms (fig. 2, i) is here thicker and more fleshy than in the 2 other species; so that the *large marginal* spines enclosed within it, which likewise correspond in number to the transverse fins, only become visible when the animal is dried. These marginal spines (fig. 11, 13. fig. 14, 15, h) are inserted nearly in a straight line with the transverse fins, and at a short distance from the outer spine of the latter, on a somewhat prominent part of the outer margin of the adambulacral plate; and are, as in the previously mentioned 2 species, thicker and longer than the spines of the transverse fins (in the middle of the arms nearly twice as long) Close in front and within the base of each marginal spine, or near to the transverse furrow separating the adambulacral plates, that is alternating with the transverse fins, lies, also enclosed in the skin, the *small marginal spine* (fig. 15, i) described by me in the 2 other species, and which has the same slightly curved lancet-like shape as in our 2 other Norwegian species (see fig. 18, 21, i).

Also the dorsal side of our star-fish exhibits, when more closely examined, some differences from the P. pulvillus. *The cavity between both the cuticles of the back,* which, as we know from P. militaris, is a hatching-cavity or marsupium, and at the same time a breathing cavity which, like a tent supported by pillars, occupies the whole dorsal side, *is here considerably larger than in the 2 other species,* and on cutting a ray across in the middle of its length the cavity will appear to be nearly as high as the inner or intestinal cavity of the body (see fig. 2). As a consequence of this the *paxillæ or compound spines* (fig. 3, d, fig. 5) implanted in the reticular calcareous skeleton of the back (and covered by the interior dorsal skin) are proportionally larger. This applies especially to their shaft, which on the back of the disc (towards the end of the arms the paxillæ, *as is well known, become gradually smaller)* reaches the height of 4 Mm. (in a not much smaller specimen of P. pulvillus scarcely 2 Mm.) with a thickness of $^2/_3$ Mm.; its top is encircled with a crown of 8—11 thin needles (fig. 5, d), with in the centre 1 *(sometimes 2) longer and much* (*2—4 times*) *thicker* needle (*f*) which projects far beyond the others, and produces

Fremragning paa dennes Overflade uden dog at gjennembryde den. Hos P. pulvillus er derimod denne centrale Naal ikke større eller mærkelig tykkere end de øvrige, og derfor ere de coniske Fremragninger paa den ydre Ryghuds Overflade her mere uregelmæssigt spredte eller ikke ordnede i tydelige Rader. — *De 5 perianale Paxiller* ere ligeledes større end hos P. pulvillus og kronede med 15—18 Naale, af hvilke de 5—6, som vende imod Gatboret og tjene til at understøtte den tutformige Aabning i den ydre Ryghud, ere større og især meget tykkere end de øvrige.

Den ydre Ryghud indeholder, ligesom hos P. pulvillus, ingen Kalkstykker, og dens Porer (spiracula) forholde sig ogsaa ganske ligedan (se Fig. 4).

Respirationsrørene (Fig. 3, e, Fig. 8) (Hudgjellerne) ere betydeligt større end hos P. pulvillus, i udstrakt Tilstand 3—4 Mm. (hos P. pulvillus kun $1^1/_2$ Mm.) høie og 1—$1^1/_2$ Mm. tykke, cylindriske med afkuttet, ikke kølledannet eller tykkere Top, og ikke blot denne er, som hos hin Art, besat med smaa rundagtige, trinde, blindtarmformige eller indvendig hule Lappe, men disse omgive ogsaa Røret næsten helt nedad til dets Basis, idet de ere stillede i Krandse rundtom. *Af saadanne Krandse taltes 4 eller 5,* stillede omtrent i lige Afstand fra hinanden, af hvilke den øverste eller paa Toppen siddende bestod af talrigere, ganske tæt sammen staaende Lappe (maaske er den egentlig sammensat af 2 Krandse), i de øvrige staa disse længere fra hinanden og blive jo længere nedad imod Rørets Basis desto færre i Antal.

Madreporpladen (Fig. 6, 7) er meget stærkt hvælvet (lidt mere end halvkugleformig) 5 Mm. (hos P. pulvillus 3 Mm.) bred og 3 Mm. høi. Den ligner mere samme af P. militaris end af P. pulvillus, idet dens Overflade er noget knudret eller egentlig straaleformig ribbet. Fra Centrum af dens Top udgaar nemlig straaleformigt nedad imod Basis omtrent 16 Ribber, af hvilke nogle nedentil forene sig 2 og 2, andre eller de fleste ikke; hver af disse Ribber er paa begge Sider forsynet med talrige, ophøiede, skraa, parallele Striber, hvilke forene sig langs ad Ribbens ophøiede Midtlinie under en spids Vinkel, hvis Top vender nedad mod Basis. Madreporpladen af P. militaris viser vel Antydning til lignende straaleformige Ribber, men disse ere mere uregelmæssige og knudrede eller besatte med smaa uregelmæssige coniske Tuberkler; hos P. pulvillus har den derimod ingen Ribber, men en jævn med talrige temmelig regelmæssigt ligeløbende, lidet fordybede, liniedannede, mangfoldig mæandrisk bugtede Furer forsynet Overflade.

Generationsorganerne (Fig. 2, h), hvilke hos det iagttagne Individ ikke vare meget udviklede, havde en lignende Form af en Drueklase og vare forøvrigt i alle Henseender overensstemmende med samme af P. pulvillus.

Som Følge af, at Sugefødderne hos nærværende Art

by its extremity pushing up against the under surface of the exterior dorsal cuticle, a small conical nipple or prominence on the upper surface, yet without piercing the skin. In P. pulvillus on the other hand, this central needle is not larger nor appreciably thicker than the others; and therefore the conical prominences on the surface of the exterior dorsal skin are more irregularly distributed or not arranged in distinct rows. *The 5 perianal paxillæ* are likewise larger than in P. pulvillus and crowned with 15—18 needles, of which 5—6 which are turned towards the anus, and serve to support the cup-shaped aperture in the exterior dorsal skin, are larger and especially much thicker than the others.

The exterior dorsal cuticle contains, as in P. pulvillus, no calcareous corpuscles; and its pores (spiracula) are also quite similar (see fig. 4).

The Respiratory tubes (fig. 3, e, fig. 8) (the skin-gills) are considerably larger than in P. pulvillus; when extended 3—4 Mm. (in P. pulvillus only $1^1/_2$ Mm.) high, and $1^1/_2$ Mm. thick, cylindrical with a truncated not club-formed or thicker top; and not only is this top, as in the other species, covered with small roundish cylindrical cæca-like or inwardly hollow lobes, but these surround also the tube nearly all the way down to its base, being placed in circles round about. *Of such circles 4—5 may be numbered* situated at about equal distances from each other; the highest of them or that placed at the top, consisted of more numerous quite closely standing lobes; (perhaps it is properly composed of 2 circles) in the others the lobes are further from each other, and become fewer in number, the further downwards towards the base of the tube.

The Madreporic body (fig. 6, 7) is veryc strongly convex (rather more than semiglobular) 5 Mm. (in P. pulvillus 3 Mm.) broad, and 3 Mm. high. It resembles more that of P. militaris than that of P. pulvillus; its surface being somewhat tuberculous or properly speaking radially ribbed. From the centre of its top there proceed radially downwards towards the base about 16 ribs, of which some unite themselves below, 2 and 2, while others or the most of them do not; each of these ribs is on both sides furnished with numerous raised oblique parallel stripes uniting themselves along the elevated medial line of the rib at an acute angle, and having their extremities turned downwards towards the base. The madreporic body of P. militaris shews indeed some indication of similar radial ribs; but these are more irregular and tuberculous or covered with small irregularly conical prominences; but in P. pulvillus it has no ribs, having on the contrary an even surface marked with numerous, rather regularly running, linear, slightly indented, intricately sinuous or meandring furrows.

The organs of generation (fig. 2. h), which in the specimen observed were not much developed, had a similar cluster-like form and were also otherwise in all respects similar to those of P. pulvillus.

In consequence of the water-feet in the present spe-

ere meget talrigere, større og stillede i 4 lige Længderader og i Tværretning dannende skraa Rader, bemærkes *en Forskjel i Ambulacralskelettet* mellem denne og de 2 andre Arter af Slægten. Hos de sidste (se Fig. 18, 21, c) ere Hullerne eller Løkkerne mellem Ambulacralhvirvlerne, hvoraf Sugefødderne komme frem, ovale (i Tværretning) og danne i hver Straale 2 ganske lige parallele Længderader. Hos P. multipes ere derimod disse Løkker (Fig. 14, 15, 16, c, d) betydeligt større og langstrakt paraboliske (ligeledes, i Tværretning) eller omtrent dobbelt saa brede som hos P. pulvillus (hvilken større Brede allerede hentyder paa den betydeligere Størrelse af de i dem anbragte Sugefødder) og danne 2 svagt bøiede longitudinale Zigzaglinier i hver Straale, idet de i hver Rad ere afvexlende bredere og hver anden af dem (*d*) saaledes naar noget længere ud paa den ydre Side af Straalen end den foregaaende og efterfølgende (*c*). Hos Slægten Asterias, hvor jeg har undersøgt dette Forhold hos A. rubens og A. glacialis, danne disse Løkker (Fig. 22, 23, c c), hvilke her ere ligestore og ovale ligesom hos vore 2 andre Pterasterarter, altsaa meget mindre langstrakte end hos P. multipes, 2 meget stærkt bøiede Zigzaglinier eller rettere 4 lige Linier, idet de 2 Rader paa hver Side regelmæssigt afvexle med hinanden. Forholdet i denne Henseende hos nærværende Søstjerne staar netop midt imellem eller danner Overgangen fra det hos de 2 andre Pterasterarter og de talrige øvrige Søstjerneslægter med kun 2 Rader Sugefødder til det hos Asterias (idetmindste de europæiske Arter af denne Slægt) der har 4 Rader saadanne, stedfindende Forhold.

En Eiendommelighed ved denne saavelsom begge de andre norske Arter, altsaa udentvivl characteristisk for Slægten, er det, at den indre Endedel af begge Ambulacralhvirvler (Fig. 16, 17, h), med hvilken de formedelst smaa Tænder, der besætte dens brede afkuttede indre eller imod hinanden vendte Endeflade (Fig. 17, i), artikulere med hinanden, er stærkere tilbagebøiet (i Retningen indad imod Munden og under en stump Vinkel) end hos nogen anden mig bekjendt Søstjerneslægt.

Forekomsten af 4 Rader Sugefødder hos en Pteraster, en Slægt der staar midt inde iblandt den store Familie af Søstjerner, som af Müller og Troschel, der stille Slægten nær ved Asteriscus, netop characteriseres ved Besiddelsen af kun 2 Rader saadanne, var vistnok uventet og overaskende, og mangen overfladisk Iagttager vilde vel ikke betænke sig længe paa for vor Søstjerne at danne en ny Slægt, maaske endog en Familie. Jeg kan dog ikke paa nogen Maade beslutte mig til at adskille den fra de andre Arter af Pteraster, med hvilke den, som man vil have seet, i sin hele øvrige Bygning paa det nøieste stemmer overens, og jeg ser i det omhandlede Forhold ingen fundamental Forskjel, ikke engang en generisk, men kun en specifisk Forskjel. Aabenbart er det den store Mængde Sugefødder, som hos denne Art skulde anbringes i Straaler af ringe Længde, som har gjort en Forandring i det hos de andre Arter i denne Henseende stedfindende Forhold nødvendig, og ved en ringe Modifi-

cies being much more numerous, larger and placed in 4 straight longitudinal rows, and forming oblique rows in a transverse direction, *a difference in the ambulacral skeleton* is remarked between this and the 2 other species of the genus. In the latter (see fig. 18, 21, c) the cavities or vacancies between the ambulacral vertebræ from which the suction feet proceed, are oval (in the transverse direction) and form in each ray 2 quite straight parallel longitudinal rows. In P. multipes these intervals (fig. 14, 15, 16, c, d) are considerably larger and of an elongated parabolic form (likewise in the transverse direction) or about twice as wide as in P. pulvillus (which greater breadth already indicates the more considerable size of the water-feet located there) and form 2 slightly curved longitudinal zigzag-lines in each ray, being in each row alternately broader; and every alternate one of them (*d*) extends therefore rather more on the outer side of the ray than the preceding and following one (c). In the genus Asterias where I have examined this point in A. rubens and A. glacialis, these spaces (fig. 22, 23. c c), which here are of equal size and oval, as in our 2 other species of Pteraster — that is much less elongated than in P. multipes-form 2 very strongly curved zig-zag lines or more properly 4 straight lines; the 2 rows on each side alternating regularly with each other. In this particular our present star-fish stands just midway, or forms the transition between the 2 other species of Pteraster with the numerous other genera of star-fish that have only 2 rows of water-feet, and the Asterias (at least the European species of this genus) which have 4 rows.

A peculiarity in this as well as in both the 2 other Norwegian species, and thus without doubt characteristic of the genus is that the interior extremity of both ambulacral plates (fig. 16, 17. h) with which they are articulated together by means of small teeth covering their broad truncated interior or contiguous terminal surfaces, (fig. 17, i) are more strongly recurved (inwards towards the mouth and at an obtuse angle) than in any other genus of star-fish known to me.

The occurrence of 4 rows of water-feet in a Pteraster, a genus standing in the midst of the great family of star-fish which according to Müller & Troschel, who place the genus near to Asteriscus, is precisely characterised by possessing only 2 such rows, was certainly unexpected and surprising; and many a superficial observer would certainly not hesitate long in establishing a new genus for our star-fish, perhaps even a new family. I can however by no means persuade myself to separate it from the other species of Pteraster with which, as is evident, it otherwise agrees most minutely in its whole structure; and I do not see in the particular case under consideration any fundamental difference, nor even a generic, but only a specific difference. It is clearly the great number of water-feet which in this species have to be located in rays of little length, that has rendered necessary an alteration of the arrangements observable in other species; and by a slight modification of the ambulacral

cation af Ambulacralskelettet kommer, som vi alt have seet, denne Forandring ogsaa istand, ved hvilken Sugefødderne blive stillede i 4 istedetfor i 2 Rader. Nylig har ogsaa Stimpson (Proceedings of the Boston Soc. of Nat. Hist., vol. 8, pg. 261) begyndt at røre ved den af Müller og Troschel etablerede, i saa mange Aar urokkede Inddeling af Asteriderne, ved at vise, at det af dem som characteristiskt for Asteracanthiadernes Familie angivne Antal af 4 Rader Sugefødder aldeles ikke er gjennemgribende, idet han fandt nogle Arter med 2, andre med 6 og 8 saadanne Rader. Stimpson foreslaar derfor for denne Familie Navnet Pycnopodidæ. Dette Exempel viser ligesom det af vor Pteraster noksom, hvor misligt det er at begrunde Inddelinger i hvilkensomhelst Dyregruppe paa en eneste Character alene.

Vor nye Art vil kunne characteriseres paa følgende Maade:

Discus tumidiusculus, brachia breviora, radio disci (in tripollicari) ad eundem brachiorum ut 1 : $1^1/_2$. Paxilli dorsales velut in P. pulvillo, sed majores, in centro apicis aciculis coronati acicula ceteris longior multoqve validior. Tessella madreporiformis costis ornata radiantibus, utrinqve dense obliqve striatis. Tentacula respirationis iis P. pulvilli similia, sed majora, cylindrica apice truncato, lobulis obsita rotundatis, ad apicem crebrioribus inferneqve rarioribus, in verticillis 4—5 dispositis. Pedes suctorii in sulcis ambulacralibus latis magni, numerosissimi (circiter 150 in qvoqve radio), qvadriseriales. Pinnæ transversales pedes suctorios numero æqvantes, alternatim longiores pauloqve breviores, spinis 5 munitæ, exterioribus longioribus; margine libero lobulis ornato incrassatis carnosis, supra spinas longe prominentibus, lingulatis seu sublanceolatis, irregulariter sinuosis vel plicatis. Pinna transversalis intima cum eadem de sulco ambulacrali vicino margine laterali connata itaqve angulum oralem formans. Spinæ marginales velut in P. militari et P. pulvillo sat longæ. — Color dorsi sordide fusco-flavus, margine cinereo-albido, ventris flavido-albus lineis parallelis aurantiacis a pinnis transversalibus ad marginem disci brachiorumqve currentibus; pedes suctorii læte violacei apice albo. Diametros 3″.

Habitat rarissimus in freto Dröbachiensi, profunditate 60 orgyarum.

FORKLARING AF FIGURERNE.

Tab. 8, Fig. 1 forestiller *Pteraster multipes* seet fra Bugsiden i naturlig Størrelse; *a* Munden; *b* den vifteformige Finne ved Mundvinkelen; *c* Sugefødderne; *d* de paa Siderne af Bugfuren beliggende Tværfinner; *e* den regelmæssigt foldede Bugflade.

Fig. 2. Samme seet i Profil (en af Straalerne er skaaret af, for at vise Hulrummet mellem begge Ryggens Huder); *a* de coniske Vorter paa Ryghuden; *b* den ydre Ryghud; *c* Sugefødderne; *d* Ambulacral-Ampullerne; *e* Ambulacralskelettet; *f* den indre Ryghud; *g* Indvoldshulen; *h* Ovarierne; *i* Randbræmmen; *k* Øiepletterne.

Fig. 3. Tværsnit igjennem Ryggens Huder, forstørret; *a* den ydre Ryghud; *b* den indre Ryghud; *c* Paxillernes Skaft; *d* Paxillernes Krone; *e* Respirationsrørene.

skeleton this alteration is effected as we have seen, whereby the water-feet are placed in 4 instead of in 2 rows. Stimpson has also lately (proceedings of the Boston Soc. of. Nat. Hist., Vol 8, p. 36) begun to disturb the classification of the Asteridæ established by Müller and Troschel and unimpeached for so many years, by shewing that the number of 4 rows of water-feet indicated by them as characteristic of the family of Asteracanthiadæ is not at all constant; as he found some species with 2, and others with 6 or 8 such rows. Stimpson suggests therefore for this family the name Pycnopodidæ. This instance shews, as does also that of our Pteraster most conclusively, how injudicious it is to found classifications in any group of animals on one single character.

Our new species may be characterised in the following manner:

Discus tumidiusculus, brachia breviora, radio disci (in tripollicari) ad eundem brachiorum ut. 1 : $1^1/_2$. Paxilli dorsales velut i P. pulvillus sed majores, in centro apicis aciculis coronati acicula ceteris longior multoque validior. Tessella madreporiformis costis ornata radiantibus, utrinque dense oblique striatis. Tentacula respirationis iis P. pulvilli similia, sed majora, cylindrica apice truncato lobulis obsita rotundatis, ad apicem crebrioribus inferneque rarioribus, in verticillis 4—5 dispositis. Pedes suctorii in sulcis ambulacralibus latis magni numerosissimi (circiter 150 in quoque radio) quadriseriales. Pinnæ transversales pedes suctorios numero æquantes, alternatim longiores pauloque breviores, spinis 5 munitæ, exterioribus longioribus; margine libero lobulis ornato incrassatis carnosis, supra spinas longe prominentibus lingulatis seu sublanceolatis irregulariter sinuosis vel plicatis. Pinna transversalis intima cum eadem de sulco ambulacrali vicino margine laterali connata itaque angulum oralem formans. Spinæ marginales velut in P. militari et P. pulvillo sat longæ. Color dorsi sordide fusco-flavus, margine cinereo-albido, ventris flavido-albus, lineis parallelis aurantiacis a pinnis transversalibus ad marginem disci brachiorumque currentibus pedes suctorii læte violacei apice albo. Diametros 3″.

Habitat rarissimus in freto Dröbachiensi profunditate 60 orgyarum.

EXPLANATION OF THE FIGURES.

Tab. 8, fig. 1. Represents *Pteraster multipes* viewed from the ventral side, natural size; *a* the mouth; *b* the fan-shaped fin at the buccal angle; *c* the water-feet; *d* the transverse fins situated on the sides of the ventral furrow; *e* the regularly folded ventral surface.

Fig. 2. The same in profile (one ray is cut off in order to show the cavity between both cuticles of the dorsal skin); *a* the conical warts of the dorsal skin; *b* the outer cuticle; *c* the water-feet; *d* the ambulacral ampollæ; *e* the ambulacral skeleton; *f* the inner cuticle of the back; *g* the perivisceral cavity; *h* the ovaries; *i* the marginal rim; *k* the eye-spots.

Fig. 3. Transverse section through the dorsal skin, magnified; *a* the outer cuticle; *b* the inner cuticle; *c* the shaft of the paxillæ; *d* the crown of the paxillæ; *e* respiratory tentacles.

Fig. 4. Et Stykke af den ydre Ryghud seet fra den indre Flade; *a* Paxillernes Skaft; *b* deres Krone; *c* Respirationsrør.

Fig. 5. To Paxiller, stærkere forstørrede; *c* Skaft; *d* Krone med de secundære Naale; *e* forbindende Membran; *f* centrale Naale.

Fig. 6. Madreporpladen, seet i Profil; *a* kalkagtige Fortsatser ved Basis.

Fig. 7. Samme stærkere forstørret, seet ovenfra.

Fig. 8. Respirationsrør; *a* Basis; *b* Endedel.

Fig. 9. En Del af en Straale, seet fra Bugsideu; *a a* ydre Rader af Sugefødder; *b* indre Rader af Sugefødder; *c* afvexlende længere Tværfinner; *d* afvexlende kortere Tværfinner; *e* den foldede Ryghud.

Fig. 10—13. Tværfinner; *a* Adambulacralplader, hvortil Finnerne ere fæstede; *b* Bugens Integument; *c* Finnernes Pigge; *d* den forbindende Membrans Endelober; *e* Sugefødder; *f* Randpigge.

Fig. 14. Den adorale Del af Ambulacralskelettet, seet fra Bugsiden; *b* den mediane Rende i Bugfuren for Ambulacralkarret; *d* Ambulacralporer; *g* Tværfinnernes Pigge; *h* ydre (marginale) Pigge; *m m* vifteformige Finner dannende Mundvinklerne; *n* nedre Pigge paa samme; *o* adorale Pigge.

Fig. 15. En Del af en Straales Ambulacralskelet, seet fra Bugsiden; *a a* Ambulacralplader; *b* median Fure for Ambulacralkarret; *c* afvexlende kortere og *d* afvexlende længere Ambulacralporer; *e* Adambulacralplader; *f* Tuberkler for Piggene i Tværfinnerne; *h* Randpigge; *i* intermarginale Pigge.

Fig. 16. En Del af en Straales Ambulacralskelet med en Del af de dorsale Integumenter, seet ovenfra; *a* ydre Ryghud; *b* indre Ryghud; *c, d* Paxiller; *e* Randpigge; *f* interradiale Plader; *g* den ydre Ende af Ambulacralpladerne; *h* den indre ombøiede Ende af samme; *i* længere og *k* kortere Ambulacralporer.

Fig. 17. Ambulacralplader isolerede og stærkere forstørrede; *g* den ydre Ende; *h h* indre Ender; *i* Ledflader.

Fig. 18. En Del af Ambulacralskelettet hos *Pteraster pulvillus,* seet fra Bugsiden; *b* median Rende i Bugfuren for Ambulacralkarret; *c* Ambulacralporer; *e* Adambulacralplader; *h* Randpigge; *i* intermarginale Pigge.

Fig. 18 a. En intermarginal Pig isoleret og stærkt forstørret.

Fig. 19. Tværfinner hos Pteraster pulvillus; *a* indre, *b* ydre Ende, *d* den forbindende Huds Endelober.

Fig. 20. En Tværfinne hos *Pteraster militaris.* Bogstaverne som i foregaaende Figur.

Fig. 21. En Del af Ambulacralskelettet hos Pteraster militaris, seet fra Bugsiden; Bogstaverne som i Fig. 18.

Fig. 22. En Del af Ambulacralskelettet hos *Asterias glacialis,* seet fra Bugsiden; *b* median Rende i Bugfuren; *c c* Ambulacralporer.

Fig. 23. Samme seet ovenfra; *c c* Ambulacralporer; *g* Ambulacralpladernes Sidedele; *h* indre Del af samme.

GONIASTER HISPIDUS, M. Sars.

n. sp.

(Tab. 8, fig. 24—25).

Denne Søstjerne, som hidtil kun er fundet i et eneste Exemplar ved Skraaven i Lofoten paa 200—300 F. D., antog jeg ved første Øiekast for at være en Art af Slæg-

Fig. 4. A piece of the outer cuticle from the inner surface; *a* shaft and *b* crown of the paxillæ; *c* respiratory pores.

Fig. 5. Two paxillæ more strongly magnified; *c* shaft; *d* crown with the secondary needles; *e* connecting membrane; *f* central needles.

Fig. 6. The madreporic body seen in profil; *a* calcareous process at the base.

Fig. 7. The same more strongly magnified seen from above.

Fig. 8. Respiratory tentacles; *a* base; *b* extremity.

Fig. 9. Part of a ray seen from the ventral side; *aa* outer rows of water-feet; *b* inner rows of water-feet; *c* alternately longer transverse fins; *d* alternately shorter transverse fins; *e* folded ventral skin.

Fig. 10—13. Transverse fins; *a* adambulacral plates, to which the fins are affixed; *b* ventral integument; *c* spines of the fin; *d* terminal lobes of the connecting membrane; *e* water-foot; *f* marginal spines.

Fig. 14. Adoral part of the ambulacral skeleton seen from the ventral side; *b* medial sulcus of the ventral furrow for the ambulacral vessel; *d* ambulacral pores; *g* spines of the transverse fins; *h* exterior (marginal) spines; *m m* fanshaped fins forming the angles of the mouth; *n* inferior spines of the same; *o* adoral spines.

Fig. 15. Part of the ambulacral skeleton of a ray seen from the ventral side; *a a* ambulacral plates; *b* medial groove for the ambulacral vessel; *c* alternately shorter and *d* alternately longer ambulacral pores; *e* adambulacral plate; *f* tubercles for the spines of the transverse fins; *h* marginal spines; *i* intermarginal spines.

Fig. 16. Part of the ambulacral skeleton of a ray with a portion of the dorsal integuments seen from above; *a* exterior dorsal cuticle; *b* interior dorsal cuticle; *c d* paxillæ; *e* marginal spines; *f* interradial plates; *g* outer extremity of the ambulacral plates; *h* inner recurved extremity of the sames; *i* longer and *k* shorter ambulacral pores.

Fig. 17. Ambulacral plates isolated and more strongly magnified; *g* outer extremity; *h h* inner extremities; *i* articulating surfaces.

Fig. 18. Part of the ambulacral skeleton of *Pteraster pulvillus* seen from the ventral side; *b* medial sulcus of the ventral furrow for the ambulacral vessel; *c* ambulacral pores; *e* adambulacral plates; *h* marginal spines; *i* intermarginal spines.

Fig. 18a. Intermarginal spine isolated and strongly magnified.

Fig. 19. Transverse fins of Pteraster pulvillus; *a* interior, *b* exterior extremity; *d* terminal lobes of the connecting membrane.

Fig. 20. A transverse fin of *Pteraster militaris.* The letters as in the preceding fig.

Fig. 21. Part of the ambulacral skeleton of Pteraster militaris seen from the ventral side. The letters as in fig. 18.

Fig. 22. Part of the ambulacral skeleton of *Asterias glacialis* seen from the ventral side; *b* medial sulcus of the ventral furrow; *c c* ambulacral pores.

Fig. 23. The same seen from above; *c c* ambulacral pores; *g* lateral parts of the ambulacral plates; *h* interior part of the same.

GONIASTER HISPIDUS, M. Sars.

n. sp.

(Tab. 8, fig. 24—25.)

This star-fish, of which hitherto only a single specimen has been found at Skraaven in Lofoten at the depth of 200—300 fathoms, I considered at first glance to be

ten *Asteriscus,* som den ligner i dens pentagonale Form, dens Bevæbning saavel paa den convexe Ryg som den flade Bug med meget smaa stumpe eller spidse kalkagtige Børster eller Pigge, samt ved Skivens og Armenes steilt nedadheldende og nedentil skarpe Rand uden synlige Randplader. Ved at afskrabe Piggene bemærkedes imidlertid, at Randens Skarphed kun er tilsyneladende og har sin Grund deri, at Piggene ganske skjule de dorsale og den dorsale Del af de ventrale Randplader. Den saaledes af 2 Rader Randplader dannede Rand bliver derfor i Virkeligheden affladet og høi, samt kun lidt skarp eller vinklet der, hvor den gaar over i Bugfladen. Da der altsaa findes Randplader, saavel dorsale som ventrale, hvilke begge bidrage til Dannelsen af den høie Rand, kan vort Dyr ikke være en Asteriscus, men maa blive at henføre til Slægten *Goniaster* Agassiz (Astrogonium M. T.) eller *Goniodiscus* M. T.

Kroppen er (se Fig. 24) pentagonal med kun yderst lidet indbøiede Sider, Ryggen noget convex med en meget svag rundagtig Fordybning i Midten af alle 5 Interradier, Armenes Spids stumpt tilrundet, Randen (Pentagonens Sider) temmelig høi, og Bugen ganske flad. Dyrets Tvermaal fra den ene til den anden ligeoverfor staaende Armspids udgjør 11 Mm., deraf Skivens Radius 5 Mm. og Armens Radius 6 Mm., Kroppens største Høide $2^1/_2$ Mm., Kroppens af Randpladerne dannede Rand $1^1/_2$ Mm. høi. Farven af det levende Dyr var meget bleg morgenrødlig; i Spiritus bliver den hvid.

De dorsale Randplader (Fig. 25, g), i Antal 10 fra en Armspids til den anden, ere noget bredere end lange, ovale eller næsten rectangulære med tilrundede Hjørner, og omtrent af lige Størrelse med Undtagelse af de yderste paa hver Side, hvilke efterhaanden blive mindre imod Armspidsen, Deres Overflade er noget convex og temmelig tæt besat med kalkagtige Børster eller cylindriske, i Enden stumpt tilrundede Pigge *(a),* alle omtrent af lige Størrelse.

De ventrale Randplader, ligeledes 10 i Tallet, ere stillede, ikke lige under de dorsale, men hver af dem under to af disse, altsaa alternerende med dem. De ere af en mere rectangulær Form og en god Del bredere end de dorsale, idet de nemlig ikke alene i Forening med disse bidrage til at danne Kroppens 5 Siderande, men ogsaa danner en Bræmme langs ad den flade Bugsides Rand. Deres dorsale Halvdel (Fig. 25, h), som danner den nedre Del af Kroppens Siderande, er noget convex og tæt besat med de samme Slags Børster eller Smaapigge som de, der bedække de dorsale Randplader. Disse Smaapigge tiltage noget i Størrelse imod den ydre Rand, som er garneret med en tæt Rad af 6 saadanne, hvilke næsten ere halvt saa lange som Pladen, paa hvilken de sidde, og rettede skraat udad og nedad og saaledes bidrage til at give Randen Udseende af at være skarp. Den ventrale Halvdel af disse Plader (Fig. 26, m), som danner en Vinkel med den

a species of the genus *Asteriscus,* which it resembles in its pentagonal form, its armature, as well on the convex back as on the flat belly, in the shape of very small obtuse or pointed calcareous bristles or spines, and also in the margin of the disc and arms inclining steeply downwards with a sharp edge below, and without visible marginal plates. But on scraping off the spines, it was observed that the sharpness of the edge is only apparent, and is caused by the spines quite concealing the dorsal, and the dorsal part of the ventral marginal plates. Thus the edge formed by 2 rows of marginal plates becomes in reality obtuse and high, and only a little sharp or angular where it goes over into the ventral surface. As therefore the marginal plates exist, as well ventral as dorsal, which both concur in forming the high margin, our animal cannot be an Asteriscus, but must be referred to the genus *Goniaster* Agassiz (Astrogonium M. T.) or *Goniodiscus* M. T.

The body (see fig. 24) is pentagonal with only very slightly incurved sides. The back is somewhat convex with a very slight roundish hollow in the middle of all the 5 interradial spaces, the points of the arms obtusely rounded; the margin (sides of the pentagon) rather high, and the belly quite flat. The transverse diameter of the animal from the point of one arm to the opposite side is 11 Mm. of which the radius of the disc 5 Mm. and the radius of the arm 6 Mm. The greatest height of the body $2^1/_2$ Mm.; the margin of the body formed by the marginal plates $1^1/_2$ Mm. high. The color of the living animal is very pale pink; in spirit it becomes nearly white.

The dorsal marginal plates (fig. 25. g) 10 in number from the point of one arm to another, are somewhat broader they are long, oval or nearly rectangular with rounded angles and about of the same size, excepting the outer ones on each side, which gradually become smaller towards the point of the arm. Their surface is somewhat convex and rather closely covered with calcareous bristles or cylindrical spines (*a*) obtusely rounded at the extremity and about of equal size.

The ventral marginal plates, likewise 10 in number, are placed not quite under the dorsal, but each under two of the latter, thus alternating with them. They are of a more rectangular form, and a good deal broader than the dorsal; as they not only, in connexion with the dorsal marginal plates, contribute to form the 5 lateral margins of the body, but also form a rim along the margin of the flat-ventral side. Their dorsal half (fig. 25, h), which forms the lower part of the lateral margins of the body, is somewhat convex and thickly covered with the same sort of bristles or small spines as those which cover the dorsal marginal plates. These small spines increase a little in size towards the exterior margin, which is garnished with a close row of 6 of them, all nearly half as long as the plate wheron they are situated, and directed obliquely outwards and downwards, thus contributing to give the margin the appearance of being sharp.

dorsale Del, er ganske flad og kun i dens indre Del besat med nogle faa, meget spredte Smaapigge af omtrent samme Størrelse som dem paa de dorsale Randplader, men sylformige eller tilspidsede i Enden.

Ryggens hele Overflade er saa tæt og ensformigt besat med Børster eller Smaapigge af ganske den samme Form og Størrelse som de, der bedække de dorsale og den øvre Del af de ventrale Randplader, at Formen af Rygpladerne derved skjules (Fig. 25, a) og først kommer tilsyne, naar Piggene afskrabes.

Rygpladerne vise sig da at være meget talrige og følgelig mindre end Randpladerne, ikke stillede i regelmæssige Rader, og af rundagtig Form, større og mindre om hverandre. Fem af dem (Fig. 25, c), beliggende midt i Interradierne og stillede i en Kreds eller rosetformig omkring og i nogen Afstand fra Centrum, ere større end de øvrige (ikke betydeligt mindre end de dorsale Randplader) ligesom sædvanligt hos unge Individer af Goniaster granularis (se min „Oversigt af Norges Echinodermer" pg. 47). Rimeligvis er ogsaa det her beskrevne Individ et ungt Dyr.

Porerne af Respirationstentaklerne (Fig. 25, f) sees enkeltvis spredte hist og her paa Ryggen i de trange Rum mellem Rygpladerne. — *Anus (d)* er subcentral, ikke ganske i Centrum, men lidt til den ene Side. — *Madreporpladen (e),* som ligger noget nærmere Centrum end Skiveranden, er rundagtig, ikke fremragende, med faa og grove Furer.

Bugpladerne (Fig. 26, l) ere faa i Antal, de fleste af dem betydeligt større end Rygpladerne, og alle af polygonal (mest sexkantet) Form. De danne 4 med Kroppens Rand ligeløbende Rader. I den yderste Rad, hvor de ere størst, idet de indadtil efterhaanden blive mindre, er der 5 Plader, af hvilke den midterste næsten er saa stor som de ventrale Randplader, medens de øvrige til begge Sider efterhaanden aftage i Størrelse; i de øvrige Rader blive de indadtil des mindre og færre i Antal. Deres Overflade er flad og besat med samme Slags sylformig tilspidsede Smaapigge *(k)* som paa den indre Del af de ventrale Randpladers Bugside, kun lidt større og hyppigt dannende smaa, omtrent med Kroppens Rand ligeløbende Rader paa hver Plade.

Bugfurerne ere smale med 2 Rader Sugefødder, hvilke hos vort Individ vare indtrukne.

De saakaldte *Furepapiller (n)* ere conisk-tilspidsede eller sylformige og omtrent af Størrelse som de Pigge, der garnere Randen af de ventrale Randplader. De danne en Tværrad af sædvanlig 4, sjeldent 5, og nær ved Armspidsen 3 Pigge paa hver Adambulacralplade, altsaa omtrent 4 Længderader. De aftage noget i Størrelse indenfra udad. De paa Mundvinklerne siddende Pigge *(p)* ere endel længere og næsten dobbelt saa tykke som de egentlige Furepapiller og mere stumpt tilrundede i Enden.

The ventral half of these plates (fig. 26, m), which forms an angle with the dorsal part, is quite flat, and bears only on its interior portion some few scattered spines of about the same size as those on the dorsal marginal plates, but awl-shaped or pointed at the extremity.

The whole surface of the back is so thickly and uniformly covered with bristles or small spines of quite the same form and size as those which cover the dorsal and the upper part of the ventral marginal plates, that the shape of the dorsal plates is thereby concealed (fig. 25, a) and does not appear until the spines are scraped off.

The dorsal plates shew themselves then to be more numerous and consequently smaller than the marginal plates, not placed in regular rows, and of roundish shape, larger and smaller together. Five of them (fig. 25, c), lying in the midst of the interradial spaces and placed in a circle or in the shape of a rosette around and at some distance from the centre, are larger than the others (not much smaller than the dorsal marginal plates) as usual in young specimens of Goniaster granularis (see my „Oversigt af Norges Echinodermer" p. 47). Probably also the specimen here described is a young animal.

The pores of the respiratory tentacles (fig. 25, f) are seen distributed isolatedly here and there on the back in the narrow spaces between the dorsal plates. *The Anus (d)* is subcentral, not quite in the centre, but a little on one side. *The madreporic body (e),* which lies somewhat nearer to the centre than to the margin of the disc, is roundish, not prominent, and with a few coarse furrows.

The ventral plates (fig. 26, l) are few in number, most of them considerably larger than the dorsal plates, and all of polygonal (mostly six-sided) shape. They form 4 rows running parallel to the margin of the body. In the outer row where they are largest — as they become gradually smaller towards the interior — there are 5 plates of which the central one is nearly as large as the ventral marginal plates, while the others on both sides gradually decrease in size; in the other rows they become smaller and fewer in number towards the interior. Their surface is flat and covered with awl-pointed small spines (*k*) of the same sort as those on the interior part of the ventral side of the ventral marginal plates, only a little larger, and frequently forming small rows which run nearly parallel to the margin of the body on each plate.

The ambulacral furrows are narrow with 2 rows of water-feet which in our specimen were drawn in.

The ambulacral *papillæ* (*n*) are conically pointed or awl-shaped, and about of the same size as the spines which garnish the margin of the ventral marginal plates. They form a transverse row of usually 4, seldom 5, and near to the point of the arm 3 spines on each adambulacral plate, that is about 4 longitudinal rows. They decrease somewhat in size from within outwards. The spines on the bucal angles (*p*) are rather longer than the ambulacral papillæ, nearly twice as thick, and more obtusely rounded at the extremity.

Pedicellarier bemærkedes ikke.

Vor nye Søstjerne udmærker sig fra de hidtil bekjendte Arter af Slægten Goniaster (fra hvilken Goniodiscus M. T. heller ikke synes at være forskjellig) ved dens *tætte Bevæbning af Børster eller Smaapigge paa Kroppens hele Rygside ligetil dens nederste dorso-ventrale Rand.* Den svarer saaledes ikke til den af Müller og Troschel blandt andre for Slægten angivne Character: „Randpladernes Rand er omgiven af en Krands af Granula, eller deres Omfang bedækket af Granula; indtil denne Omgivelse ere de fuldkommen nøgne; undertiden bære de paa Midten Tuberkler".

Denne Character er dog aabenbart ikke af nogen væsentlig Betydning, ligesom ogsaa den, hvorved Goniodiscus skal adskille sig fra Goniaster, nemlig: „Randpladerne ere paa deres hele Overflade granulerede".

Goniaster hispidus vil kjendes ved følgende Diagnose:

Corpus pentagonum, dorso convexo, ventre plano, radio disci ad eundem brachiorum (in individuo unico observato, verosimile juvenili, 11 Mm. magno) ut 1 : $1^1/_5$, sinubus inter brachia apice obtuse rotundata perparum excavatis. Dorsum totum, etiam scuta marginalia superiora et pars dorsalis scutorum marginalium inferiorum, spinulis minutis cylindricis obtusis dense tectum. Scuta dorsalia marginalibus minora, rotundata, numerosa; scuta ventralia dorsalibus majora, pauca, polygonalia, spinulis minutis subulatis subseriatis minus dense tecta. Spinæ ad sulcos ambulacrales 3—4 seriatæ, subulatæ, interiores majores, exteriores minores. Tessella madreporiformis centro disci paulo vicinior qvam margini. Color pallide roseus.

Habitat ad insulas Lofoten (Skraaven) profunditate 200—300 orgyarum.

FORKLARING AF FIGURERNE.

Tab. 8, Fig. 24 forestiller *Goniaster hispidus,* seet ovenfra i naturlig Størrelse.

Fig 25. Den ene Halvpart af samme, seet ovenfra, forstørret (nedentil ere Piggene skrabede af for at vise de underliggende Plader). *a a a* den piggede Overflade af Ryghuden; *b b* deu blottede Rand; *c* større Dorsalplader, dannende en Rosette omkring Centrum; *d* Analaabningen; *e* Madreporpladen; *f* Respirationsporer; *g* dorsale Randplader; *h* den dorsale Del af de ventrale Randplader; *i* Enden af en Straale.

Fig. 26. Den samme Halvpart, seet fra den ventrale Side (nedentil er en Del af Piggene skrabede af). *k k* ventrale Pigge; *l* ventrale Plader; *m* ventrale Randplader; *n* Furepapiller; *o* Munden; *p* adorale Pigge; *r* Randpigge; *s* blottede Ambulacralplader.

Pedicellariæ were not observed.

Our new star-fish is distinguished from the hitherto known species of the genus Goniaster (from which Goniodiscus M. T. does not seem to differ) by its *thick armour of bristles or small spines on the whole dorsal side of the body all down to its lowest dorso-ventral margin.* It does not therefore answer to the character given among others by Müller and Troschel for the genus. „The margin of the marginal plates is surrounded by a circle of granula or their circumference is covered with granula; up to this circumference they are perfectly naked; sometimes they have tubercles in the middle".

This character is however evidently not of any essential importance, neither is that whereby the Goniodiscus is said to be distinguished from the Goniaster, namely: „The marginal plates are granulated over their whole surface".

Goniaster hispidus will be konwn by the following diagnosis:

Corpus pentagonum dorso convexo, ventre plano radio disci ad eundem brachiorum (in individuo unico observato verosimile juvenili 11 Mm. magno) ut 1 : $1^1/_5$, sinubus inter brachia apice obtuse rotundata perparum excavatis. Dorsum totum etiam scuta marginalia superiora et pars dorsalis scutorum marginalium inferiorum spinulis minutis cylindricis obtusis dense tectum. Scuta dorsalia marginalibus minora rotundata numerosa; scuta ventralia dorsalibus majora, pauca, polygonalia, spinulis minutis subulatis subseriatis minus dense tecta. Spinæ ad sulcos ambulacrales 3—4 seriatæ subulatæ interiores majores exteriores minores. Tessella madreporiformis centro disci paulo vicinior quam margini. Color pallide roseus.

Habitat ad insulas Lofoten (Skraaven) profunditate 200—300 orgyarum.

EXPLANATION OF THE FIGURES.

Pl. 8, fig. 24. Represents *Goniaster hispidus* seen from above, natural size.

Fig. 25. The one half of the same seen from above, magnified (in the lower part the spines are scraped off in order to show the underlying plates). *a a a* the hispid surface of the dorsal skin; *b b* the denudated edge; *c* larger dorsal plates forming a rosette around the centre; *d* the anal orifice; *e* the madreporic body; *f* respiratory pores; *g* dorsal marginal plates; *h* dorsal part of the ventral marginal plates; *i* extremity of a ray.

Fig. 26. The same half seen from the ventral side (in the lower part the spines are scraped off). *k k* ventral spines; *l* ventral plates; *m* ventral marginal plates; *n* ambulacral papillæ; *o* mouth; *p* adoral spines; *r* marginal spines; *s* adambulacral plates denudated.

BESKRIVELSE
OVER
NOGLE NYE NORSKE COELENTERATER.
AF
J. KOREN & D. C. DANIELSSEN.

PHELLIA TUBICOLA, Nob.
(Tab. 9, Fig. 1, 2).

Kroppen, som er cylindrisk, langstrakt, omtrent 4 Gange saa lang, som bred, og sparsomt besat med yderst smaa gjennemborede Vorter (cinclides), — er omgivet af et hudagtigt Rør, hvis nederste Del er fastvoxet til Basaldelen, lige ved den egentlige Fod; men hvis øverste Del danner en fri, afrundet Rand (Fig. 1, 2 a). Denne rørformige Beklædning er egentlig en Forlængelse af Epidermis, der sækformig voxer op over Dyrets Krop til omtr. 10 Mm. nedenfor Skiven. Det saaledes fremkomne Rør, som er 20 Mm. langt, temmelig fast, er ujævnt paa den ydre, men glat paa den indre Flade, og bestaar af en gjennemskinnende baade farve- og structurløs Membran, hvori Sandkorn ere tykt incrusterede. Basaldelen er bredere end Kroppen, udvider sig skiveformigt og er fæstet til Skjæl eller Stene. Skiven er plan, bredere end Basaldelen og forsynet med 3 Rækker retractile, temmelig lange Tentakler, 48 i Antal. I den ydre Række er der 24; i den indre er der 12, og her ere de længere end i den ydre Rad, og i den mellemste er der ligeledes 12. Mundaabningen, der er rund, kan skydes op til en kegleformig Fremstaaenhed.

Rørets Farve er graa-brun med lidt mørkere Pletter. Kroppen er kjødrød, halvgjennemskinnende, hvorved Længdemusculaturen bliver synbar og danner hvidlige Længdestriber. Skiven er rosenrød, og forsynet med lysere Striber, der gaa fra Mundranden til Grunden af de indre Tentakler. Samtlige Tentakler ere ligesom Skiven rosenrøde.

Dyret kan trække sig ganske ind i Røret, saa at Skiven fuldkommen skjules; men naar det er udstrakt, rager Skiven 10—12 Mm. over Rørets frie Rand.

Vi fandt 3 Exemplarer paa 200 Favnes Dyb, hvoraf de to vare fæstede til døde Skaller af Lima excavata, og det tredie paa et Coralstykke i Korsfjorden ved Bergen.

ARTSCHARACTEREN.

Overhuden fast, sandincrusteret, dannende et fuldstændigt Rør, sammenvoxet til Basaldelen. Denne skive-

DESCRIPTION
OF
SOME NEW NORWEGIAN COELENTERATES.
BY
J. KOREN & D. C. DANIELSSEN.

PHELLIA TUBICOLA, Nob.
(Tab. 9, fig. 1, 2).

The body, which is cylindrical, elongated, about 4 times as long as broad and sparingly covered with extremely small loopholes (cinclides), is enclosed in a membranous tube, the lower part of which is connate with the basal part of the animal close to the proper foot, but the upper part of which forms a free rounded margin (fig. 1, 2 a). This tubular covering is property a continuation of the epidermis, which grows, sack-like, up over the animal's body to about 10 Mm. below the disc. The tube thus produced, which is 20 Mm. long and rather solid, is uneven on the exterior, but smooth on the inner surface, and consists of a translucent, colorless and structureless membrane, in which grains of sand are thickly incrusted. The basal part is wider than the body, expands, disc-like, and is attached to shells or stones. The disc is plane, wider than the basal part and furnished with 3 rows of retractile, rather long tentacles 48 in number. In the exterior row, there are 24; in the interior, 12; and here they are longer than in the exterior row; in the middle row, there are also 12. The oral aperture, which is round, can be raised to a conical prominence.

The color of the tube is greyish brown, with rather darker spots. The body is carnation red, semi-translucent, whereby the longitudinal muscular system becomes visible, forming whitish longitudinal stripes. The disc is rosy red, with lighter stripes going from the margin of the mouth to the base of the interior tentacles. All the tentacles are, like the disc, rosy red.

The animal can withdraw itself entirely into the tube; so that the disc is completely concealed; but when it is extended, the disc projects 10—12 Mm. over the free margin of the tube.

We found 3 specimens at the depth of 200 fathoms, of which two were attached to dead shells of Lima excavata, and the third on a piece of coral, in the Korsfjord at Bergen.

CHARACTERISTICS OF SPECIES.

The cuticle (Epidermis) solid, incrusted with sand, forming a complete tube, connate with the basal part.

formigt udvidet. Kroppen cylindrisk, langstrakt. 48 Tentakler i 3 Rækker. Rørets Farve graabrun; Kroppens kjødrød; Skivens og Tentaklernes rosenrød.

PHELLIA ABYSSICOLA, Nob.

(Tab. 9, Fig. 3, 4).

Kroppen er cylindrisk, omtrent ligesaa lang, som tyk og beklædt overalt med en temmelig tyk Epidermis, der er blød, ikke meget stærkt adhæreret til Legemet, og indvævet med fint Sand og Ler (Fig. 3 a). I denne Overhud opdages hist og her fine Aabninger, der svare til smaa vorteformige Forhøininger (loop-holes, cinclides), som findes i stor Mængde rundtom paa Kroppen; men som først iagttages, naar Overhuden er fjernet, hvilket kan ske med temmelig Lethed. Basaldelen er noget videre end den øvrige Del af Kroppen, hvis øverste Rand er glat og afrundet. Skiven er plan og forsynet med 56 retractile, lige lange Tentakler, der staa i to Rækker, — 28 i hver. Munden er rundagtig, foldet. Farven: Overhuden er graabrun, isprængt mørkere brune Pletter. Naar Overhuden er borttagen, frembyder Kroppen en bleg Kjødfarve. Skiven er mørk brunrød, forsynet med lysere Striber, der udgaa fra Mundranden henimod de indre Tentakler. Svælget og Maven har samme Farve, som Skiven. De ydre Tentakler ere bleg-gulrøde, de indre ere paa deres nederste Halvdel og paa hele den indre Flade brunrøde, medens den Flade, der vender til den ydre Tentakelrad, er betydelig blegere.

Af denne Art fandt vi to Exemplarer fæstede til Stene i Korsfjorden paa 250 Favnes Dyb.

ARTSCHARACTEREN.

Overhuden tyk, løs, sandincrusteret, overalt fastvoxet til Kroppen. Basaldelen lidet udvidet. Tentaklerne 56 i to Rækker. Overhudens Farve graabrun med mørkere Pletter. Kroppen bleg-kjødrød. Skiven mørk-brunrød med lysere Striber. De ydre Tentakler bleg-gulrøde, de indre brune ved Grunden og paa den indre Flade; men blegere forøvrigt.

Ved den engelske Kyst er der ifølge Gosse funden 4 Arter af Slægten Phellia, hvilke ere beskrevne af ham. — Saavidt os bekjendt er der ved de norske Kyster ikke tidligere fundet nogen Art, der kan henføres til denne Slægt; men vi have Grund til at antage, at der i vor Koralregion vil findes flere, naar man først er bleven opmærksom paa dem.

Zoanthidernes Familie har af de forskjellige Forfattere været inddelt i flere Slægter, der stundom ere blevne reducerede, stundom forøgede i Antal, alt eftersom der har været tillagt Tilheftningsmaaden eller andre mindre

The latter developed disc-like. The body cylindrical, elongated 48 tentacles in 3 rows. The color of the tube greyish brown; that of the body carnation red; that of the disc and tentacles rosy red.

PHELLIA ABYSSICOLA, Nob.

(Tab. 9, fig. 3, 4).

The body is cylindrical, about as long as it is thick and covered everywhere with a rather thick epidermis, which is soft, not very strongly adhering to the body, and interwoven with fine sand and clay (fig. 3 a). In this outer skin, we perceive minute openings here and there corresponding to small wart-like elevations (loop-holes, cinclides) which are found in great numbers round about on the body, but which are only noticeable when the epidermis is removed, which may easity be effected. The basal part is somewhat broader than the other part of the body, the upper margin of which is smooth and rounded. The disc is plane, and furnished with 56 retractile, equally long tentacles standing in 2 rows, 28 in each. The mouth is roundish and corrugated. The color of the epidermis is greyish brown, speckled with darker brown spots. When the epidermis is removed, the body exhibits a pale carnation color. The disc is dark brown-red, with lighter stripes proceeding from the oral margin towards the inner tentacles. The æsophagus and the stomach have the same color as the disc. The exterior tentacles are pale yellowish red; the interior are on their lower half, and on all the interior surface, brownish red; while the surface which turns towards the outer row of tentacles, is considerably paler.

Of this species we found 2 specimens attached to stones, in the Korsfjord at the depth of 250 fathoms.

CHARACTERISTICS OF SPECIES.

The epidermis thick, loose, incrusted with sand, everywhere connate with the body. The basal part a little enlarged. The tentacles 56 in two rows. The color of the epidermis, greyish brown with darker spots. The body pale carnation. The disc, dark brown-red with lighter stripes. The exterior tentacles, pale yellowish red; the interior, brown at the base and on the inner surface, but otherwise paler.

On the English coast, there have been found, according to Gosse, 4 species of the genus Phellia, which have been described by him. So far as we know, there has not previously been found on the Norwegian coasts any species that can be referred to this genus; but we have reason to presume that in our coral region, several will be found, when once attention has been drawn to them.

The family of the Zoanthidæ has been by the various authors divided into several genera, which sometimes have been reduced, sometimes increased in number, accordingly as more or less importance has been ascribed to the

væsentlige Characterer større eller mindre Betydning. Af de i Tidernes Løb opstillede Slægter: Zoanthus, Palythoa, Mammillifera, Sidisia, Corticifera, Epizoanthus, har Milne-Edwards kun godkjendt to, nemlig Zoanthus, som udbreder sig med rodformige Stoloner, og Palythoa, hvis Udbredning er i Form af en Plade eller et Teppe. Gosse er imidlertid ikke bleven staaende ved disse to Slægter, men har reduceret dem til én, nemlig Zoanthus, Cuv., idet han ikke har kunnet erkjende, at Befæstningsmaaden egner sig til deraf at danne Slægter. Han har paavist, at hos Slægten Zoanthus forekommer de forskjelligste Maader, paa hvilke Dyret befæster sig, uden at noget andet Charactermærke, der skulde kunne begrunde en ny Slægt, har været at opdage.

Foruden de ved den norske Kyst tidligere fundne Arter af Zoanthus, nemlig Zoanthus (Mammillifera) incrustatus, Düb. & Kor. og Z. arcticus, Sars, have vi fundet en tredie, som nu skal beskrives.

ZOANTHUS NORVEGICUS, Nob.
(Tab. 9, Fig. 5, 6).

Fra den fælles Grund (Cœnosark) hæver Polyperne sig i en snart perpendiculær, snart horizontal, snart skjev Stilling (Fig. 5). Polyperne ere kølleformige med en smalere Basaldel, der er cylinderformig. Den øverste Del er henved dobbelt saa stor i Omkreds, som Basaldelen, og ganske afrundet, naar Tentaklerne ere indtrukne. Kroppen har en graagul, tynd, men fast Overhud, hvori fin Sand er incrusteret, og indenfor denne Epidermis er den egentlige Hud bleg, rosenfarvet, spillende lidt i det gule. Munden er aflang, lidt conisk fremstaaende og omgiven af en mørkere, rosenfarvet Ring, hvorfra fine, hvide Striber gaa straaleformigt hen til de indre Tentakler. Skiven er, naar den er fuldkommen udslaaet, plan, forsynet paa dens ydre, frie Rand med bladformige Lapper, hvori ligeledes fin Sand er incrusteret, og hvis Antal svarer til den ydre Tentakelrække. Tentaklerne sidde afvexlende i to Rader; men naar Polypen er fuldkommen udstrakt, og Skiven med Tentaklerne fuldstændigt udslaaede, ser det ud, som om der kun var én Rad Tentakler. Hos det fuldvoxne Dyr er der 18 Tentakler i hver Række.

I den ydre Række ere Tentaklerne omtr. 7 Mm. lange, i den indre ere de noget længere. Størrelsen af Polyperne variere temmelig meget; de største, vi observerede, vare 25 Mm. høie, 5 Mm. brede ved Basaldelen og 8 Mm. ved Skiven. Paa yngre Exemplarer var Antallet af Tentaklerne 15 i hver Række, enkelte havde 16.

Zoanthus norvegicus sidder dels enkeltvis, dels flere sammen; men hyppigst i store Grupper, der kunne indtage en knyttet Haands Omfang, og hvori mere end halvhundrede Polyper ere fæstede ved det fælles Cœnosark, der beklæder snart Svampe, saasom Tethea cranium, snart Skaller af Lima excavata og stundom Stammer af Primnoa lepadifera og Paragorgia arborea.

mode of attachment or other less essential characteristics. Of the genera established in the course of time: Zoanthus, Palythoa, Mammillifera, Sidisia, Corticifera, Epizoanthus, Milne-Edwards has only acknowledged two, namely Zoanthus, which expands itself with root-shaped Stolons, and Palythoa, the expansion of which is in the form of a plate or a carpet. Gosse has however not stopped at these two genera, but has reduced them to one, namely Zoanthus, Cuvier; as he has not been able to admit that the mode of attachment is appropriate to the formation of genera. He has shewn that the genus Zoanthus exhibits the most different modes in which the animal attaches itself, without any other characteristic mark by which a new genus might be established, being discoverable.

Besides the species of Zoanthus previously found on the Norwegian coast, namely Zoanthus (Mammillifera) incrustatus Düb. & Kor. and Z. arcticus Sars, we have found a third, which shall now be described.

ZOANTHUS NORVEGICUS, Nob.
(Tab. 9, fig. 5, 6).

From the common base (Coenosark) the polyps rise in a sometimes perpendicular, sometimes horisontal, sometimes slanting position (fig. 5). The polyps are club-shaped, with a smaller basal part which is cylindrical. The upper part is about double as large in circumference as the basal part and quite rounded when the tentacles are retracted. The body has a greyish yellow, thin, but firm epidermis, wherein fine sand is incrusted; and inside of this epidermis the proper skin is pale rose-colored, with a tinge of yellow. The mouth is oblong, projecting a little conically, and surrounded by a darker rose-colored ring, from which fine white stripes go radially to the interior tentacles. The disc is, when completely expanded, plane, and has on its exterior free margin leaf-like lobes, in which likewise fine sand is incrusted, and the number of which corresponds to that of the outer row of tentacles. The tentacles are situated alternately in two rows; but when the polyp is completely extended, and the disc with the tentacles entirely expanded, it seems as if there was only one row of tentacles. In the adult animal there are 18 tentacles in each row.

In the exterior row, the tentacles are about 7 Mm. long; in the interior they are somewhat longer. The size of the polyps varies considerably: the largest we observed were 25 Mm. high, 5 Mm. broad at the basal part, and 8 Mm. at the disc. In younger specimens, the number of tentacles in each row was 15; some had 16.

Zoanthus norvegicus exists partly single, partly several together, but frequently in large groups that may occupy as much space as a closed hand wherein more than 50 polyps are attached by the common coenosark, which may cover sometimes sponges, (Tethea cranium) sometimes shells of Lima excavata, and now and then stems of Primnoa lepadifera and Paragorgia arborea.

Vi have fundet den i Korsfjorden ved Bergen paa en Dybde af 300 Favne, blandt Koraller. Koren har seet hos Professor G. O. Sars Exemplarer af den samme Art, som han havde fundet paa lignende Dyb i Coralregionen, hvor den forresten forekommer i stor Mængde.

Zoanthus norvegicus nærmer sig mest til Z. anguicoma, Norm., og Z. Couchii, Johnston, men adskiller sig dog væsentlig fra Begge.

Zoanthus anguicoma har et Cœnosark, der danner smale Baand, hvorfra Polyperne reise sig; disse ere kun lidet bredere foroven (næsten cylindriske), have omtr. 34 Tentakler, der ere meget længere end Skiven. Farven er blegrød-hvid.

Zoanthus Couchii forekommer ligeledes i baandformige Udbredninger. Polyperne ere cylindriske. Tentaklerne 28, temmelig korte. Kroppens Farve er bleg-brun af det incrusterede Sand, forøvrigt farveløs og transparent; Skiven gjennemskinnende graalig-rød med fine hvide Pletter; Tentaklerne næsten farveløse med hvide Spidser, og Munden omgiven af en hvid opak Ring.

Vor Art forekommer i større og mindre klumpedannende Grupper med et fast incrusteret Cœnosark, der udbreder sig over store Flader, og hvorfra de kølleformige Polyper udspringe. Tentaklerne sidde i to Rækker, 18 i hver, og de indre ere længere end Skiven i udstrakt Tilstand.

ARTSCHARACTEREN.

Cænosarket fast, læderagtigt, udbredt i store Flader og stærkt incrusteret med brungul Sand. Polyperne kølleformige, tæt siddende i store Grupper. Tentaklerne i 2 Rækker, 18 i hver; de indre længere end Skiven. Overhuden graagul, incrusteret. Skiven bleg-rosenrød med hvide Striber. Munden omgiven af en mørkere rosenfarvet Ring. Tentaklerne rosenrøde.

FORKLARING OVER FIGURERNE.

Tab. 9, Fig. 1. Phellia tubicola, naturlig Størrelse.
Fig. 2. Ph. tubicola, forstørret; *a* Rørets frie Rand.
Fig. 3. Ph. abyssicola, naturlig Størrelse; *a* Overhuden.

Fig. 4. Ph. abyssicola, seet fra oven.
Fig. 5. En Gruppe af Zoanthus norvegicus, med udstrakte og indtrukne Tentakler.
Fig. 6. Z. norvegicus, forstørret; *a* Cænosark.

Anmærkning. Paa Tabula 4 findes afbildet under Fig. 8 Cerianthus Lloydii, liggende i det aabnede hudagtige Rør, samt under Fig. 9 Mundpartiet med Tentaklerne af samme Dyr. Dengang det Dyr blev tegnet, antog jeg (Danielssen) det for en ny Art, som blev benævnt Cerianthus borealis, men vi bleve senere opmærksomme paa, at det var Gosse's Cerianthus Lloydii. Den fandtes først af os i Moldefjorden, og var da ny for Skandinaviens Fauna. Senere er den af os funden i Bergensfjorden. Den forekommer paa dyndet Bund paa en Dybde fra 20 til 50 Favne.

We have found it in the Korsfjord at Bergen, at the depth of 300 fathoms among corals. Koren has seen in the possession of Professor G. O. Sars, specimens of the same species which he had found at the same depth in the coral region, where moreover it occurs in great numbers.

Zoanthus norvegicus resembles most Z. anguicoma, Norm. and Z. Couchii, Johnst. but differs nevertheless essentially from both of them.

Zoanthus anguicoma has a Coenosark which forms small ribbons, whence the polyps rise: the latter are only a little broader above (nearly cylindrical); they have about 34 tentacles, which are much longer than the disc. The color is pale reddish white.

Zoanthus Couchii occurs also in ribbon-like extensions. The polyps are cylindrical. The tentacles 28, rather short The color of the body is pale-brown from the incrusted sand, otherwise the body is colorless and transparent. The disc is translucent, greyish red with fine white spots. The tentacles nearly colorless with white points, and the mouth surrounded with a white opaque ring.

Our species occurs in larger and smaller clod-like groups, with a firmly incrusted Coenosark extending itself over large surfaces, and whence the club-shaped polyps proceed. The tentacles are situated in two rows, 18 in each, and the interior ones are longer than the disc, when they are extended.

CHARACTERISTICS OF SPECIES.

The Coenoesark solid, leathery, spread over large surfaces and strongly incrusted with brownish-yellow sand. The polyps club-shaped, situated closely in large groups. The tentacles in 2 rows, 18 in each; the interior ones longer than the disc. The epidermis greyish yellov, incrusted. The disc, pale rose-colored with white stripes. The mouth surrounded with a darker rose-colored ring. The tentacles rose-colored.

EXPLANATION OF THE FIGURES.

Tab. 9, fig. 1. Phellia tubicola, natural size.
Fig. 2. Ph. tubicola, magnified; *a* the free margin of the tube.
Fig. 3. Ph. abyssicola, natural size. *a* the upper cuticle (Epidermis).
Fig. 4. Ph. abyssicola, seen from above.
Fig. 5. A group of Zoanthus norvegicus with extended and retracted tentacles.
Fig. 6, Z. norvegicus, magnified; *a* Coenosark.

Note. In Tab. 4, there is delineated fig. 8 the Cerianthus Lloydii, lying in the opened skin-like tube; also fig. 9 the oral part, with the tentacles, of the same animal. When tbis animal was drawn, I (Danielssen) considered it to be a new species which was called Cerianthus borealis; but we subsequently perceived that it was Gosse's Cerianthus Lloydii. It was found first by us in the Moldefjord and was at that time new as regards the Fauna of Scandinavia. We found it afterwards in the Bergenfjord. It occurs on miry bottom at a depth of 20 to 50 fathoms.

ALCYONIUM FRUTICOSUM, Sars.

Nedenstaaende Beskrivelse af ovennævnte Art, hvilken i sin Tid er udkastet af afdøde Professor Sars[1]), knytter sig til Fig. 8, 9, 10, 11, Tab. 3.

Basis (pes sterilis) 1—2″ lata, sæpius lobata, membranácea, expansa, aliena corpora obducens. Stipes erectus, cylindricus, tripollicaris, $^1/_3$″ crassus, undique ramis densis obsitus; rami pollicares aut minores, apice obtuse rotundato, ramulis similibus brevioribus præditi. Polypi magni, in verrucas (columnas) fere hemisphæricas octoradiatas retractiles. Color pallide miniaceus seu aurantiacus, basi rubicundo-grisea aut plumbea, polypis roseo-albis hyalinis.

Hyppig ved Finmarken, f. Ex. ved Vadsø, Øxfjord etc. paa 60—100 Favnes Dyb og, som jeg af Exemplarer i Kjøbenhavns Universitetssamling har seet, ogsaa ved Grønland. Den har nogen Lighed med den middelhavske Alcyonium palmatum, Pallas; men adskiller sig fra denne, som kun har faa og fingerformede, i samme Plan stillede Grene, ved sine rundtom Stammen (dog med Tilbøilighed til at ordne sig i samme Plan) staaende talrige (hos 3″ høie Exemplarer indtil 20—24 i Tallet) tætsiddende, i Enden but tilrundede Grene, hvilke atter ere besatte med flere eller færre (1—10) korte Smaagrene.

FORKLARING OVER FIGURERNE.

Tab. 3, Fig. 8. Alcyonium fruticosum, naturlig Størrelse.
Fig. 9. En Polyp, forstørret, i hvis Hud sees Kalkspicler. *a* indtrukne Tentakler; *b* Mave; *c* Mesenterialfilamenter; *d* Kalkspicler.
Fig. 10. En Gruppe indtrukne Polyper, lidt forstørret.
Fig. 11. Kalkspicler. *a, b, c* forskjellige Kalkspicler.

[1]) Forhandlinger i Videnskabsselskabet i Christiania, Aar 1860, pag. 140.

ALCYONIUM FRUTICOSUM, Sars.

The following description of the above species, which was formerly sketched by the late Professor Sars[1]), stands in connexion with fig. 8, 9, 10, 11, tab. 3.

Basis (pes sterilis) 1—2″ lata, sæpius lobata, membranacea, expansa, aliena corpora obducens. Stipes erectus, cylindricus, tripollicaris, $^1/_3$″ crassus, undique ramis densis obsitus; rami pollicares aut minores, apice obtuse rotundato, ramulis similibus brevioribus præditi. Polypi magni, in verrucas (columnas) fere hemisphæricas octoradiatas retractiles. Color pallide miniaceus seu aurantiacus, basi rubicundo-grisea aut plumbea, polypis roseo-albis hyalinis.

Frequent in Finmark, for instance at Vadsø, Oxfjord &c at the depth of 60—100 fathoms, and, as I have seen from specimens in the collection of the university in Copenhagen, also near Greenland. It has some resemblance to the Mediterranean Alcyonium palmatum Pallas, but differs from the latter, which has only a few finger-like branches placed in the same plane, by its numerous branches standing round abont the stem (yet with a tendency to arrange themselves in the same plane). In specimens 3″ high, these branches were up to 20—24 in number, situated close together, and obtusely rounded at the extremity. The branches are moreover furnished with a greater or less number (1—10) of short small off-shoots.

EXPLANATION OF THE FIGURES.

Tab. 3, fig. 8. Alcyonium fruticosum, natural size.
Fig. 9. A polyp, magnified, in the skin of which calcareous spicula appear; *a* retracted tentacles; *b* stomach; *c* mesenterial filaments; *d* calcareous spicula.
Fig. 10. A group of retracted polyps, slightly magnified.
Fig. 11. Calcareous spicula. *a, b, c* various calcareous spicula.

[1]) Forhandlinger i Videnskabsselskabet i Christiania, Aar 1860, pag. 140.

BIDRAG
TIL
DE VED DEN NORSKE KYST LEVENDE PENNATULIDERS NATURHISTORIE.
AF
J. KOREN & D. C. DANIELSSEN.

Siden sidste Hefte af Fauna littoralis Norvegiæ udkom, er der af flere Forfattere leveret vigtige naturhistoriske Bidrag til Pennatuliderne. Professor Milne-Edwards[1]) har i sit righoldige Værk over Corallerne samlet Alt, hvad der til den Tid var bekjendt over Søfjærene, og tillige characteriseret de af Valenciennes opstillede tvende nye Slægter. Senere har Herklots,[2]) Gray,[3·6]) Verrill,[4]) Richiardi,[5]) Kölliker[7]) og Panceri[8]) ikke alene fremstillet flere nye baade Slægter og Arter, men ogsaa væsentlig bidraget til at fuldstændiggjøre Systematiken og at opklare disse Dyrs Anatomie og Physiologie.

1. Milne-Edwards, H. Histoire naturelle des coralliaires ou polypes proprement dits. Tom. 1. Paris 1857.
2. Herklots, A. I. Notices pour servir à l'étude des polypiers nageurs ou pennatulides. Leyden 1858.
3. Gray, E. I. The Annales and Magazine of Natural History. Vol. 5. Third Series. London 1860.
4. Verrill. Bulletin of the Museum of comparative Zoology. Cambridge 1863.
5. Richiardi, S. Monografia della famiglia dei pennatularii. Bologna 1869.
6. Gray, E. I. Catalogue of Sea-Pens or pennatulariidæ in the collection of the british Museum. London 1870.
7. Kölliker, A. Anatomisch-systematische Beschreibung der Alcyonarien. 1ste Abtheilung, die Pennatuliden. Frankfurt a. M. 1872.
8. Panceri, M. Annales des sciences naturelles, 46 Année, 5 Serie. Tom. 16. Paris 1872.

PTILELLA GRANDIS, Ehrenberg [1]).
(Tab. XI, Fig. 1—7).

Synon.: *Pennatula grandis,* Ehrenberg. Die Corallenthiere des rothen Meeres. Pag. 66.

P. borealis, Sars. Fauna littoralis Norvegiæ, 1ste Lieferung, Pag. 17, Tab. 2, Fig. 1—4.

[1]) Naar vi have optaget E. I. Gray's nydannede Slægt Ptilella, saa er det, fordi vi samstemme med ham deri, at Pennatula borealis, Sars, saa væsentlig adskiller sig fra de øvrige Pennatulaer, at den som Følge deraf ikke kan længere staa i deres Række. Vore Undersøgelser have imidlertid sat os istand til at udvide Slægtscharactererne, og derved gjort Slægtsdannelsen endmere berettiget. Hvad nu Sars's Artsbenævnelse „borealis" betræffer, saa have vi ikke kunnet bibeholde den, da senere Observationer, fornemmelig af Köl-

CONTRIBUTION
TO
THE NATURAL HISTORY OF THE PENNATULIDÆ LIVING ON THE NORWEGIAN COAST.
BY
J. KOREN & D. C. DANIELSSEN.

After the publication of the last number of Fauna littoralis Norvegiæ, several authors have given some important contributions to the Natural History of the Pennatulidæ. Professor H. Milne-Edwards[1]) has in his instructive work on Corals collected all that was known at the time about the Sea-Pens and also characterised the two new genera established by Valenciennes. Subsequently Herklots,[2]) Gray,[3·6]) Verrill,[4]) Richiardi,[5]) Køllliker[7]) and Panieri[8]) have not only brought forward several new genera and species, but also essentially contributed to complete the system and to elucidate the anatomy and physiology of these animals.

1. Milne Edvards, H. Histoire naturelle des coralliaires ou polypes proprement dits. Tom. 1. Paris 1857.
2. Herklots, A. I. Notices pour servir à l'étude des polypiers nageurs ou pennatulides. Leyden 1858.
3. Gray, E. I. The annals and Magazine of Natural History. Vol. 5. Third Series. London 1860.
4. Verrill. Bulletin of the Museum of comparative Zoology. Cambridge 1863.
5. Richiardi, S. Monografia della famiglia dei pennatularii. Bologna 1869.
6. Gray, E. I. Catalogue of Sea-Pens or pennatulariidæ in the collection of the british Museum. London 1870.
7. Kölliker, A. Anatomisch-systematische Beschreibung der Alcyonarien. 1ste Abtheilung, die Pennatuliden. Frankfurt a. M. 1872.
8. Panceri, M. Annales des sciences naturelles, 46 Année, 5 Série. Tom. 16. Paris 1872.

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[1]) If we have adopted E. I. Gray's newly formed genus Ptilella, it is because we agree with him that Pennatula borealis, Sars, is so essentially different from the other Pennatulæ that it can consequently no longer stand in their ranks. Our investigations have, however, enabled us to extend the generic characters and thereby justified still more the formation of the genus. Now with regard to Sars' specific appellation „borealis" we have not been able to retain it; as subsequent observations, chiefly those of Köl-

P. borealis, Herklots. Not. pour servir à l'étude des polypiers nageurs ou pennatulides. Pag. 17.

P. borealis, Gray. Ann. and Magazine Natur. Hist. 1860. Pag. 22.

P. borealis, Richiardi. Monograf. d. fam. dei pennatularii. Pag. 31, Tab. 2, Fig. 15, 16, 17.

P. borealis, Kölliker. Anat.-systemat. Beschreibung der Alcyonarien. 1ste Abtheilung. Die Pennatuliden. Pag. 136.

Ptilella borealis, Gray. Catalogue of Sea-Pens or pennatulariidæ. Pag. 21.

Til de af Sars og Kölliker givne Beskrivelser over denne skjønne Søfjær, skulle vi tilføie Følgende:

Ventralfladen er bred og nøgen. Zooiderne indtage ikke alene Lateralfladen, men strække sig i stor Mængde langs den øverste Side af Finnen over paa Dorsalfladen, hvor de henimod dennes Midte ende i 3 stundom 4 Rækker, hvoraf den 4de er den mindste. Omtrent to Trediedele af Finnens Ventralrand ere optagne af stærkt udviklede Zooider. Af Lateralzooiderne udmærke især nogle sig ved deres Størrelse, og disse have sædvanligen sit Sæde to ved hver Bladbasis, og ikke som Kölliker og tildels Sars siger „1 mellem hvert Blad."

Finnens Dorsalrand, der er Sars's convexe, er besat med fra 2—4 Rader Celler, der, som Sars rigtig udtrykker sig, staa mere paatvers end paalangs af Finnen.

Polyperne ere uden Spicler, hvorimod Cellerne ere rigt udstyrede dermed.

Kølliker betvivler Rigtigheden af de af Sars beskrevne røde Vorter paa Stilken, og antager dem for Længdefolder, der sandsynligvis ere fremkomne først ved Døden; men Sars har aabenbar Ret; thi foruden at vi paa mange Exemplarer have iagttaget baade Længde- og Tverfolder paa det nævnte Sted, have vi tillige seet, at de omtalte Vorter have siddet tildels paa selve Folderne, tildels mellem dem. De af Sars beskrevne Appendices paa den øverste Spidse af Rachis ere kun endnu ikke fuldt udviklede Blade (Finner); thi paa meget store Exemplarer have vi observeret, at disse af ham beskrevne Lapper ere udvoxede til fuldkomne Finner, forsynede med Polyper, dog saaledes, at selve Finnens Basis endnu bærer Spor af dets lappede Oprindelse. Sars har ogsaa virkelig været inde paa den Tanke, at disse Appendices kunde være fremvoxende Finner; men hans Tvivl var dog saa stærk, at han igjen frafaldt den, og antog dem for særegne Organer.

Hvad nu den indre Bygning angaar, saa omtaler Sars kun Axen, og det paa en temmelig ufuldstændig Maade.

liker og Richiardi, have bragt det til fuld Sikkerhed, at Sars's borealis er Ehrenbergs „grandis". Selv Sars sees i sin Beskrivelse over P. borealis at have været i Tvivl om, hvorvidt disse to Søfjære vare identiske; og Milne-Edwards nærer den samme Tvivl; men da ingen af disse Naturforskere havde seet Ehrenbergs Originalexemplar i Berlinermuseet, forblev Sars's Art i lange Tider staaende som en fra „grandis" forskjellig, indtil endelig Kölliker ved selvstændige Undersøgelser og Sammenligninger af Originalexemplarerne kom til det sikkre Resultat, at „borealis" og „grandis" var den samme Art. Da nu Ehrenbergs Navn er det ældste, finde vi det rigtigst at optage dette.

P. borealis, Herklots. Not. pour servir à l'étude des polypiers nageurs ou pennatulides, pag. 17.

P. borealis, Gray. Ann. and Magazin Natur. Hist. 1860, pag. 22.

P. borealis, Richiardi. Monograf. d. fam. dei pennatularii, pag. 31, tab. 2, fig. 15, 16, 17.

P. borealis, Kölliker. Anat.-systemat. Beschreibung der Alcyonarien. 1ste Abtheilung. Die Pennatuliden. Pag. 136.

Ptilella borealis, Gray. Catalogue of Sea-Pens or pennatulariidæ. Pag. 21.

To the descriptions given by Sars and Kölliker of this beautiful Sea-Pen we will add the following.

The ventral surface is broad and naked. The Zooides occupy not only the lateral surface, but extend in great numbers along the upper side of the fin (pinna) on to the dorsal surface, towards the middle of which they terminate in 3, sometimes 4 rows, whereof the 4th is the smallest. About two thirds of the ventral margin is occupied by strongly developed zooides. Of the lateral zooides, some are especially remarkable for their size, and are moreover usually situated two at each leaf-base; not as Kölliker and (occasionally) Sars say "1 between each leaf".

The dorsal margin of the fin, which is Sars' convex, bears 2—4 rows of cells which, as Sars correctly expresses it, are situaded more across than along the fin.

The Polyps are without spicula, while the cells have them in abundance.

Kölliker doubts the accuracy of Sars' description of the red warts on the stalk, and supposes them to be longitudinal folds which have probably been produced by death; but Sars is evidently right; for we have in many specimens seen both longitudinal and transverse folds in the places mentioned, and moreover we have also seen the warts situated partly on the folds and partly between them. The appendages described by Sars on the superior point of the Rachis, are only imperfectly developed leaves (fins); for in very large specimens we have observed these lobes described by him developed into complete fins bearing Polyps, while the base of the fin itself still bore traces of its originally lobed form. Sars had also really entertained the notion that these appendages might be nascent fins; but his doubt was still so strong that he abandoned the notion and supposed them to be particular organs.

Now as to the interior structure, Sars mentions only the axis, and that rather incompletely. Il is probable

liker and Richiardi, have established beyond a doubt that Sars' borealis is Ehrenberg's „grandis". Sars himself in his description of P. borealis seems to have been in doubt as to the identity of these two Sea-Pens; and Milne Edwards entertains the same doubt, but as neither of these naturalists had seen Ehrenberg's original specimen in the Berlin Museum, Sars' species continued for a long time to be considered as distinct from „grandis" until at last Kölliker, by independent investigation and comparison of the original specimens, came to the positive result that „borealis" and „grandis" are one and the same species. As Ehrenberg's name is the oldest, we feel bound to adopt it.

Det er derfor sandsynligt, at han — ligesaalidt som Kölliker — har havt Anledning til at anstille nogen fuldstændigere anatomisk Undersøgelse.

Kanalsystemet hos Ptilella grandis afviger noget fra det, der ifølge Köllikers Beskrivelse tilhører Pennatulíderne ialmindelighed. Med Hensyn til Længdekanalerne er at bemærke, at Ventralkanalen er temmelig smal; Sidekanalerne, der omfatte Axen, ere hver for sig bredere, og Dorsalkanalen mindst ligesaa bred, som begge disse tilsammen.

Dorsalkanalen gaar lige op til Spidsen af Rachis; dette er ogsaa Tilfældet med Ventralkanalen; men denne danner i en Afstand af 100 Mm. fra Spidsen en stærk Udvidning (Fig. 4, 5 v′) for at give Plads for den krumbøiede Axe (Fig. 4 a). Udvidningen er 30—40 Mm. lang og omtr. 15 Mm. bred; ovenfor og nedenfor er Kanalen kun 6 Mm. bred. Sidekanalerne (Fig. 4, 5 Sv Sh), der omfatte Axen, gaa i sin fulde Bredde op til det Sted, hvor Udvidningen paa Ventralkanalen og Krumningen af Axen begynder. Idet Axen krummer sig, udspiles dens Skede saaledes, at den danner en Dobbeltmembran, der er stramt udspændt, og indtager hele Axekrumningens Bredde (Fig. 5 a′), — og da Axens Spids, der ender paa det Sted, hvor de tvende dorsale Septa smelte sammen, er fæstet her, altsaa langt dybere nede end den høieste Del af Krumningen, saa dannes en blindsækformig Udvidning af hver Sidekanal derved, at de fra Axeskeden udgaaende to ventrale Septa drages op over Krumningen (Fig. 5 Sh″). Den ikke blindsækformige Del af Sidekanalen fortsætter nu sit Løb opover den axeløse Del af Rachis, hvor den kun maaler 2 Mm. i Gjennemsnit (Fig. 5 Sh′), indtil den 12 Mm. fra Spidsen ender haarformig.

For end bedre at gjøre dette meget indviklede Forhold mellem Axen og Sidekanalerne forstaaeligt, have vi leveret 3 schematiserede Gjennemsnit, hvortil vi henvise.

Axen, der er forsynet med en Cuticula og en Skede, nærmer sig opad mere og mere Ventralfladen, og bliver alt tyndere og tyndere, indtil den i en Afstand af 62 Mm. (største Exemplar) gjør en Bøining fra Ventral- mod Dorsalfladen lidt skjevt til Høire, gaar saa atter nedad i en Strækning af omtr. 20 Mm., hvorved dannes en stærk Bue, hvis Bredde udgjør 10—12 Mm. Nu bøier den sig atter mod Ventralfladen lidt til Venstre, hvor den paany krummer sig for at gaa et lidet Stykke mod Dorsalfladen, gjør her den sidste og mindste Bøining, førend den ender tynd som en fin Synaalsspids paa det ovenfor omtalte Sted. Paa denne Vei danner den ikke mindre end 4 Anser (Fig. 7); paa mindre Exemplarer fandtes kun 3. — Nedad i Stilken derimod bliver den alt tykkere og tykkere, er temmelig knudret paa Overfladen, og danner ved den opsvulmede, kjødede Del en Bue, hvis convexe Del svarer til Dorsalfladen og den concave til Ventralfladen. Nu løber den et lidet Stykke næsten perpendiculært, men danner da atter en Bøining, hvis convexe Del vender til

that neither he nor Kølliker had had opportunity to make any thorough anatomical investigation.

The vascular system in the Ptilella grandis differs somewhat from that which, according to Kölliker's description, belongs to the Pennatulidæ in general. With respect to the longitudinal canals, it is to be remarked that the ventral canal is rather narrow; the lateral canals surrounding the axis are each severally wider; and the dorsal canal is at least as wide as both of them together.

The dorsal canal goes right up to the point of the Rachis; this is also the case with the ventral canal; but the latter forms, at a distance of 100 Mm. from the point, a great enlargement (fig. 4, 5, v′) in order to make room for the bent axis (fig. 4 a). The enlargement is 30—40 Mm. long, and about 15 Mm. wide; while above and below it the canal is only 6 Mm. wide. The lateral canals (fig. 4, 5 Sv Sh) which surround the axis, extend in their whole width up to that place where the extension of the ventral canal and the curvature of the axis begin. As the axis bends itself, its sheath is stretched so as to form a double membrane, which is tightly extended and which occupies the whole width of the curvature of the axis (fig. 5 a′) and as the point of the axis, which terminates at the place where the two dorsal septa unite, is attached here, that is to say much lower down than the highest part of the curvature, there is formed a cæcum-like enlargement of each lateral canal, by the two ventral septa, which proceed from the sheath of the axis, being drawn up over the curvature (fig. 5 Sh″). The part of the lateral canal which is not cæcum-like, continues its course along that part of the Rachis which is without axis: and it is here only 2 Mm. in diameter (fig. 5 Sh′) until it terminates in a capillary form about 12 Mm. from the point.

The better to elucidate this very complicated relationship between the axis and the lateral canals, we have given 3 schematised sections, on which we remark.

The axis, which is furnished with a cuticle and a sheath, approaches the ventral surface more and more in an upward direction and becomes thinner and thinner, until at a distance of 62 Mm. (in the largest specimens) it makes a curve from the ventral towards the dorsal surface a little obliquely to the right; it then goes down again in the length af about 20 Mm. whereby a strong curve is formed with a breadth of 10—12 Mm. It now curves itself again towards the ventral surface a little to the left, where it again turns a little way towards the dorsal surface, makes here the last and smallest curve before it terminates, as thin as the point of a fine needle, at the place above mentioned. In this course it forms no less than 4 curves (fig. 7) in small specimens there are only 3. But below in the stalk it becomes on the contrary thicker and thicker, it is rather tuberculous on the surface, and forms with its enlarged fleshy part a curve, the convex part of which answers to the dorsal surface, and the concave part to the ventral surface; it

Ventralfladen, den concave til Dorsalfladen, og ender temmelig tynd, 15 Mm. fra Stilkens Spidse i en Krog, vendt mod Dorsalfladen (Fig. 6). Axen antager saaledes i Stilken næsten *S* Formen, er 32 Mm. i Omkreds paa den nederste Bøining, og 27 Mm. paa den Krumning, som svarer til Stilkens opsvulmede Del. Axens nederste Ende er blød og bøielig, bestaar af fibrillært Bindevæv med indsprængte Kalkkorn.

Ved Axens Skede findes intet Særegent, uden at den i den nederste Trediedel af Stilken bliver meget tyk, ja endog indtil 3, 5 Mm.

Axens Cuticula dannes af en hyalin elastisk Membran, hvori sees en Mængde Ernæringskanaler og Kalkkorn.

Efter hvad vi ovenfor have fremhævet, kan Slægten Ptilella characteriseres saaledes:

Meget store Søfjære med store, brede, halvmaaneformige Finner, forsynede med flere Rækker Polypceller. Ventralfladen nøgen. Zooiderne laterale, strækkende sig henimod Dorsalfladens Midte. Paa Finnernes ventrale Rand stærkt udviklede Zooider. Kjønsorganerne i Finnerne. Paa Stilkens øverste Del en stor, kjødet Opsvulmen. Axen tyk, rund, nedentil *S* formig bøiet, endende i en Krog; oventil derimod ender den slyngeformig.

Af de Exemplarer, der have staaet til vor Raadighed, give vi nedenstaaende Maalinger i Millimeter:

	1.	2.	3.	4.	5.	6.	7.
Stokkens Længde	250	250	465	600	660	740	780
Fjærens Do.	170	148	305	435	465	530	545
Stilkens Do.	80	102	160	165	195	210	235
Finnernes Do.	24	26	30	33	35	50	42
Finnernes Bredde ved Basis	10	11	16	15	17	15	16
Finnernes Antal paa hver Side	30	30	45	49	39	58	70
Omkredsen af Stilkens opsvulmede Del . . .	50	55	110	95	113	155	120
Cellernes Antal	48-50	50	80-85	90-95	85-90	90-100	80-90
Do. Afstand	0,5	0,5	0,5	0,5	1	1	1

Denne Søfjær synes at have en stor Udbredning ved den norske Kyst. Sars angiver Ranenfjord i Nordland og Herø paa Søndmør som de Steder, hvorfra de to Exemplarer, han havde til sin Beskrivelse, vare tagne. Af de 7 Exemplarer, vi have havt til Undersøgelse, er No. 1 fra Helgeland, No. 2 fra Lofoten (begge Steder tilhørende Nordlands Amt), No. 3 Stavangerfjord, No. 4 Hardangerfjord, No. 5 og 7 Bergensfjord, No. 6 Christiansund. — Dybden angives fra 150—200 Favne paa Dyndbund. Alle ere opfiskede paa Liner.

BESKRIVELSE OVER FIGURERNE.

Tab. 11, Fig. 4. *v* Ventralkanal; *d* Dorsalkanal; *v'* den udvidede Del af Ventralkanalen, som indeholder Axens bugtede Del eller *a* Krumning. *Sv. Sv* den ved Snittet aabnede venstre Sidekanal, i hvis blinde Del er indført Sonden *r;*

then runs a little way almost perpendiculary, after which it again forms a curve with the convex part towards the ventral surface, and the concave part towards the dorsal surface, terminating rather thin 15 Mm. from the point of the stalk in a hook turned towards the dorsal surface (fig. 6). The axis thus assumes nearly the form of *S* in the stalk; it is 32 Mm. in circumference at the lowest curve, and 27 Mm. at the curve which answers to the swollen part of the stalk. The lower extremity of the axis is soft and flexible, consisting of fibrillous connecting tissue with calcareous granules therein.

In the sheath of the axis there is nothing peculiar, excepting that in the lower third part of the stalk it becomes very thick; even to 3,5 Mm.

The cuticle of the axis is formed of a hyaline elastic membrane, wherein appear a number of alimentary canals and calcareous granules.

According to what we have above stated, the genus Ptilella may be characterised as follows:

Very large sea-pens with large broad semilunar fins bearing several rows of polyp-cells. The ventral surface naked. The zooids lateral, extending towards the centre of the dorsal surface. On the ventral margin of the fins strongly developed zooids. The sexual organs in the fins. On the upper part of the stalk a large fleshy enlargement. The axis thick, round, curved downwards in the form of an *S* terminating in a hook, while in the upper part it terminates in a volute.

Of the specimens that have been at our disposal, we give below the dimensions in Millimetres:

	1.	2.	3.	4.	5.	6.	7.
Length of Polypary . . .	250	250	465	600	660	740	780
Do. of Feather	170	148	305	435	465	530	545
Do. of Stalk	80	102	160	165	195	210	235
Do. of Fins	24	26	30	33	35	50	42
Breath of Fins at Base .	10	11	16	15	17	15	16
Number of Fins on each side	30	30	45	49	39	58	70
Circumference of enlarged part of stalk . .	50	55	110	95	113	155	120
Number of cells	48-50	50	80-85	90-95	85-90	90-100	80-90
Distance of do.	0,5	0,5	0,5	0,5	1	1	1

This sea-pen seems to be extensively distributed on the Norwegian coast. Sars indicates Ranenfjord in Nordland and Herö in Söndmör as the places whence the two specimens which he had for his descriptions were taken. Of the 7 specimens we have had for examination No. 1 is from Helgeland, No. 2 from Lofoten (both places in the district of Nordland); No. 3 Stavangerfjord; No. 4 Hardangerfjord; No. 5 & 7 Bergensfjord; No. 6 Christiansund. — The depth is given at 150 & 200 fathoms on miry bottom. All the specimens were taken on fishermen's lines.

DESCRIPTION OF THE FIGURES.

Tab. 11, fig. 4. *v* the ventral canal; *d* the dorsal canal; *v'* the enlarged part of the ventral canal containing the sinuous part of the axis, or *a* curve; *Sv. Sv* the left lateral canal opened by the section, with the probe *r* inserted in

i Bunden sees den ved Axens Bugtning udspændte Skede for samme, der skiller mellem begge Sidekanaler, hvis anden Væg *Sv'*, som dannes af det venstre ventrale Septum, ligger strammet over Axens Krumning. *x* og *y* Tilheftningspunkterne for det venstre ventrale Septum, hvorfra dettes Udkrængning med Axekrumningen foregaar. *z* Tilheftningspunktet for Axespidsen. *t* en ved Snittet tilbagebleven Bro af Sarcosomaet; paa den mod Axen vendende Flade findes Fortsættelsen af den venstre Sidekanal.

Fig. 5. Figuren efter samme Præparat, som Fig. 4, i noget formindsket Maalestok. Axen er, seet fra Ventralfladen, bøiet over til Venstre for bedre at vise Sidekanalernes Forhold, og den i Fig. 4 med *Sv'* betegnede Del af venstre Sidekanals Væg er borttaget; derved faar man se *a'* den udspændte Axeskede. *d*, *v*, *v'*, *z*, *x* og *y*, som i forrige Figur. *Sh"* den Del af det høire ventrale Septum, som er krænget op over Axekrumningen og saaledes begrændser den blinde Del af Sidekanalen. Fra denne er ført en Sonde *r r* ind og ud igjennem en Aabning i Væggen af den Del af høire Sidekanal *Sh*, som fortsætter sin Vei lige opover, for med en temmelig pludselig Forsnevring at fortsættes som *Sh'* i den bløde Skillevæg, som bliver tilbage mellem Dorsal- og Ventralkanalen lige til Spidsen. *r'*, *r'* en Sonde indført i de sidstnævnte Dele af Kanalen. *o* Omslagsfolden af det ventrale Septum paa høire Side.

Fig. 6. Den nederste Del af Axen.

Fig. 7. Den øverste Del af Axen.

BESKRIVELSE OVER DE SCHEMATISEREDE GJENNEMSNIT.

Fig. 1. Gjennemsnit af Stokken lige ved Begyndelsen af Ventralkanalens *v* Udvidning. *a* Axen. *Sp v* de to ventrale Septa. *Sp d* de to dorsale Septa.

Fig. 2. Gjennemsnit af Stokken lige ved Tilheftningsstedet af Axens Spidse *a"*, seet nedenfra. *o o* Omslagsfolden af de ventrale Septa *Sp v*. *Sh"* den blindsækformige Del af høire Sidekanal. *Sh* den lige opadgaaende Del [1]). Jevnfør denne Figur med Figur 5. De øvrige Bogstaver som paa Figur 1.

Fig. 3. Gjennemsnit af Stokken lidt ovenfor Omslagsfolden. Bogstaverne som paa de foregaaende Figurer.

PENNATULA ACULEATA, Nob.

(Tab. 11, Fig. 8—9).

Synon.: *P. aculeata,* Dan. Forhandlinger i Videnskabsselskabet i Christiania 1858, pag. 25 [2]).

P. phosphorea varietas aculeata, Sars. Nyt Magazin for Naturvidenskaberne, 12te Bind, pag. 340.

P. phosphorea varietas aculeata, Kölliker, l. c. p. 134 et 366, Tab. IX, Fig. 73.

Polypstokkens hele Form nærmer sig meget P. phosphorea. Ventralfladen er fornemmelig paa den nederste Halvdel forsynet med en ikke meget dyb Fure. Paa hver Side af denne sees 2—3 Rækker Pigge, af hvilke den yderste

[1]) I den blindsækformige Del af den venstre Sidekanal er indtegnet den opadgaaende Krumning af Axen, som trækker det ventrale Septum med sig.

[2]) Ved en feilagtig Redaction fra Secretærens Side blev Arten opført under mit Navn alene, medens jeg i mit Foredrag udtrykkelig gjorde opmærksom paa, at Arten tilhørte et fælles Arbeide af Koren og mig. D. C. Danielssen.

the cæcum; at the bottom appears the sheath stretched by the bending of the axis, and forming the division between both lateral canals, the other wall of which *Sv'* formed by the left ventral septum, lies stretched over the bend of the axis. *x* and *y* the points of attachment for the left ventral septum from which its evagination with the bend of the axis proceeds; *z* the point of attachment for the extremity of the axis; *t* a bridge of the sarcosoma remaining in the section; on the surface that turns towards the axis, the continuation of the left lateral canal.

Fig. 5. According to the same preparation as fig. 4, on a somewhat diminished scale. The axis is seen from the ventral surface bent over to the left, in order the better to show the position of the lateral canals; the part of the wall of the left lateral canal indicated in fig. 4 by *Sv'* being removed, whereby are shown: *a'* the stretched sheath of the axis; *d*, *v*, *v'*, *z*, *x* and *y* as in the preceding figure. *Sh"* the part of the right ventral septum which is turned up over the bend of the axis and thus bounds the cæcal part of the lateral canal. From this, there is introduced *r r* a probe into and out through an opening in the wall of that part of the right lateral canal *Sh* which continues its course straight upward, and is continued with a rather sudden contraction as *Sh'* in the soft partition which remains between the dorsal and the ventral canal, quite up to the point. *r' r'* a probe introduced into the last named part of the canal; *o* the covering fold of the ventral septum on the right side.

Fig. 6. The lower part of the axis.

Fig. 7. The upper part of the axis.

DESCRIPTION OF THE SCHEMATISED SECTIONS.

Fig. 1. Section of the polypary just at the beginning of the extension of the ventral canal *v*. *a* the axis; *Sp v* the ventral septa; *Sp d* the dorsal septa.

Fig. 2. Section of the polypary just at the place of attachment of the point *a"* of the axis seen from below. *o o* the covering fold of the ventral septa *Sp v*. *Sh"* the cæcum-like part of the right lateral canal. *Sh* the part which goes straight upwards [1]). Compare this figure with figure 5. The other letters as in fig. 1.

Fig. 3. Section of the polypary a little above the covering fold. The letters as in the preceding figures.

PENNATULA ACULEATA, Nob.

(Tab. 11, fig. 8–9).

Synon.: *P. aculeata,* Dan. Forhandlinger i Videnskabsselskabet i Christiania, 1858, p. 25.[2])

P. phosphorea varietas aculeata, Sars. Nyt Magazin for Naturvidenskaberne 12 B., pag. 340.

P. phosphorea varietas aculeata, Kölliker, l. c. p. 134 & 366, Tab. IX, fig. 73.

The whole form of the polypary resembles very much that of the P. phosphorea. The ventral surface has, especially in the lower half of it, a not very deep furrow. On each side of this appear 2—3 rows of spines,

[1]) In the cæcal part of the left lateral canal the upward bend of the axis is delineated, drawing the ventral septum with it.

[2]) By an error of the secretary in transcribing, the species was indicated under my name alone, while in my paper I had expressly called attention to the circumstance that the species belonged to a joint work of Koren and myself. D. C. Danielssen.

Række, der staar nærved Bladenes Basis, opnaar en Længde af indtil 3 Mm. Imellem disse Pigge, der ere stærkt udviklede Zooider, sees en Mængde almindelige Zooider ligesom strøede over Stokken, og som endog gaa over paa Furen. Paa den øverste Del af Ventralfladen derimod er Furen som oftest forsvunden, og da er hele Fladen tæt besat med Zooider, hvoraf de, der danne Pigge, ere de mest fremragende.

Dorsalfladens Midtparti er nøgent; og til hver Side, mellem hver Bladbasis, sees paa den nederste Del 1, paa den midterste og øverste Del 2 Rækker og stundom Begyndelsen til en 3die Række Zooider, hvoraf enkelte endog gaa op paa selve Bladgrunden.

Bladene staa temmelig vidt fra hverandre, ere brede ved Basis og bære lange Celler (3—4 Mm.), der ere forsynede med stærke Spicler, hvoraf ialmindelighed 8 rage et godt Stykke ud over Cellens frie Rand. Af disse Spicler vare de længste 2,8 Mm. lange og 0,11 Mm. brede.

Polyperne have en Rad røde Spicler paa den aborale Flade, saavel af Tentaklerne, som af deres Traade (Pinnulæ).

Zooiderne ere ligeledes udstyrede med Spicler, især de pigformede, hos hvilke de endog opnaa en Længde af indtil 3,3 Mm., og en Bredde paa Midten af 0,16 Mm.

Zooiderne have som sædvanligt to lange Mesenterialfilamenter, der forlænge sig ind i den kjødede Del af Stokken, og variere i Længde fra 1,21 Mm. til 2,5 Mm.

Den hypogastriske Hule er temmelig lang og forlænger sig ind i Stokken.

Axen bliver opad tyndere og tyndere, og ender hageformigt 15 Mm. fra Spidsen af Rachis. Nedad bliver den tykkere, og beholder Tykkelsen indtil den nederste Trediedel af Stilken, hvor den igjen aftager. I en Afstand af 10 Mm. fra den nederste Ende danner den en Anse, gaar saa omtrent 10 Mm. opad, for i en yderst fin Spids at fæste sig paa Skeden. Den er paa det Tykkeste 1 Mm.

Farven paa Bladene er lyserød, isprængt mørkerøde Længdestriber. Cellerne og Bladets Ventralrand stærk brunrøde. Polyperne bleg gulrøde med en stærk rød Rand paa den aborale Flade af Tentaklerne. Rachis vinrød; Stilken svag gulrød.

Findested Christiansund, hvor den paa en enkelt Localitet forekom temmelig hyppig paa Lerbund i en Dybde fra 80—100 Favne. Sars angiver at have fundet den ved Christiansund paa 30—70 Favne, ved Østeraat i Throndhjemsfjorden paa 100 Favne; derimod Carpenter og Wyville Thomson i det atlantiske Hav paa 300 Favne.

I. F. Whiteaves har fundet den i Bugten af St. Lawrence paa et Dyb fra 160—200 Favne. Men da den er noget afvigende fra vor, har han opført den som en Varietet og kaldt den Pennatula aculeata variet. canadensis.

of which the exterior row situated near to the base of the leaves, attains a length of as much as 3 Mm. Between these spines, which are strongly developed zooids, there appear a number of ordinary zooids, as it were dispersed over the polypary, some of them even on the furrow. On the upper part of the ventral surface, the furrow usually disappears, and then the whole surface is thickly covered with zooids, of which those which form spines are the most prominent.

The middle part of the dorsal surface is naked; and on each side between the bases of the leaves there appear, on the lower part 1, and on the middle and upper part 2 rows and sometimes an incipient 3rd row of zooids of which some even go up on the base of the leaf itself.

The leaves are situated rather far from each other; they are wide at the base, and bear long cells (3—4 Mm.) with strong spicula of which usually 8 project a long way beyond the free margin of the cell. Of these spicula the longest were 2,8 Mm. long. and 0,11 Mm. broad.

The polyps have one row of red spicula on the aboral surface as well of the tentacles as of their filaments (Pinnulæ).

The zooids are also provided with spicula, especially those in the form of spines, in which the spicula even reach a length of up to 3,3 Mm.; with a width in the middle of 0,16 Mm.

The zooids have as usual two long mesenteric filaments, which are prolonged into the fleshy part of the polypary and vary in length from 1,21 Mm. to 2,5 Mm.

The hypogastric cavity is rather long and is continued into the polypary.

The axis becomes thinner and thinner in the upward direction and terminates in the form of a hook 15 Mm. from the point of the rachis. It becomes thicker downwards and retains its thickness down to the lower third part of the stalk, where it again diminishes. At a distance of 10 Mm. from the lower extremity, it forms a bend going then about 10 Mm. upward and attaching itself in an extremely fine point to the sheath. It is in the thickest part 1 Mm.

The color of the leaves is light red sprinkled with dark red longitudinal stripes. The cells and the ventral margin of the leaf are intensely brown-red. The polyps pale yellowish-red, with an intensely red margin on the aboral surface of the tentacles. The rachis claret-color and the stalk pale yellowish-red.

Found at Christiansund, where in a single locality it occurred rather abundantly on clay bottom at the depth of 80—100 fathoms. Sars reports that he has found it at Christiansund at the depth of 30—70 fathoms, at Østeraat in the Throndhjemsfjord in 100 fathoms; while Carpenter and Wyville Thomson have found in the Atlantic ocean in 300 fathoms.

I. F. Whiteaves has found it in the Gulf of St. Lawrence at the depth of 160—200 fathoms; but as it is somewhat different from ours, he has indicated it as a variety and called it Pennatula aculeata variet. canadensis.

Baade Whiteaves og Verrill ere enige deri, at aculeata er en fra phosphorea distinct Art.

Den kan characteriseres saaledes: Stokkens Ventralflade forsynet med 4—6 Rader stærkt udviklede Zooider i Form af Pigge, hvoraf de yderst stillede ere de største. Bladene staa vidt fra hverandre, ere brede ved Basis og bære lange Celler.

Udmaalinger i Millimeter af forskjellige Exempl.:

	A.	B.	C.	D.
Stokkens Længde	175	125	75	53
Rachis' do.	109	79	44	30
Stilkens do.	66	46	31	23
Bladenes do.	25	20	11	7
— Bredde ved Basis .	5	4,5	3	1
— Antal	31	27	19	11
Polypernes Antal	11	11	7	5

FORKLARING OVER FIGURERNE.

Tab. 11, Fig. 8. Pennatula aculeata, naturlig Størrelse, seet fra Bugsiden.

Fig. 9. Samme fra Rygsiden.

PENNATULA ACULEATA VARIET. ROSEA, Nob.

Stokken 72 Mm. lang. Rachis 45 Mm., paa Midten 3 Mm. bred. Stilken 27 Mm., dens nederste Ende næsten kølleformig. Ventralfladen har paa Midten en Længdefure, der er nøgen, og paa hvis begge Sider findes en stor Mængde Zooider, som danne temmelig fremragende tilspidsede Papiller, der staa saa tæt sammen, at hele Rachis paa dette Sted faar et taglagt Udseende. Zooiderne næsten hvide; de yderste, altsaa de nærmest Bladene, ere størst.

Dorsalfladen har ligeledes en Længdefure, og her staa Zooiderne paa den nederste Del af Rachis i 1, paa Midten i 2, fra Midten og op til Spidsen i 3 Rækker, der dog afbrydes ved Bladinsertionerne. Zooiderne næsten hvide.

Bladenes Antal 19. Længden 11 Mm. og deres Bredde ved Basis 3, 5 Mm.

Polypernes Antal 8. Cellerne temmelig lange, hvide paa deres øverste Del og forsynede i Randen med 8 hvide lange Spicler. Polyperne hvide med et svagt rødligt Skjær, og Tentaklerne, ligesom deres Traade, forsynede med en Rad rosenrøde Spicler.[1]) Stilkens Farve er svag gulrødlig, den øvrige Del af Søfjæren fin rosenrød.

Denne Varietet adskiller sig fra den egentlige aculeata væsentlig ved følgende: 1. Den har en robustere Bygning. 2. Zooiderne paa Ventralfladen staa tættere og opnaa langtfra den Længde, som Piggene paa aculeata; paa Dorsalfladen derimod danne de flere Rader og ere større. 3. Bladene staa tættere, ere flere i Antal, bredere og kortere, og bære flere Polyper. 4. Cellernes øverste

[1]) Hos et ligestort Exemplar af aculeata var Bladenes Antal 16; deres Længde 12 Mm. og Bredden ved Basis 2 Mm. Polypernes Antal 5.

Both Whiteaves and Verrill agree that aculeata is a species distinct from phosphorea.

It may be characterised thus: The ventral surface of the polypary bearing 4—6 rows of strongly developed zooids in the from of spines, of which the outermost are the largest. The leaves standing far from each other are broad at the base and bear long cells.

Measurements in Millimetres of different specimens.

	A.	B.	C.	D.
Length of Polypary	175	125	75	53
Do. - Rachis	109	79	44	30
Do. - Stalk	66	46	31	23
Do. - Leaves	25	20	11	7
Breadth - Do. at base . .	5	4,5	3	1
Number - Do.	31	27	19	11
Number - polyps	11	11	7	5

EXPLANATION OF THE FIGURES.

Tab. 11, fig. 8. Pennatula aculeata, natural size, seen from the ventral side.

Fig. 9. The same from the dorsal side.

PENNATULA ACULEATA VARIET. ROSEA, Nob.

The polypary 72 Mm. long. Rachis 45 Mm., in the middle 3 Mm. broad. The stalk 27 Mm. its lower end nearly club-shaped. The ventral surface has in the middle a longitudinal furrow, which is naked, and on both sides of which there are a great number of zooids forming rather prominent pointed papillæ, so close together that the whole rachis has in this part an imbricated appearance. The zooids nearly white; the outermost ones, or those nearest the leaves, largest.

The dorsal surface has also a longitudinal furrow; and here the zooids are situated on the lower part of the rachis in 1, in the middle in 2, from the middle and up to the point in 3 rows, which are however interrupted by the insertions of the leaves. The zooids nearly white.

The number of the leaves 19; the length 11 Mm. and their breadth at the base 3,5 Mm.

The number of the polyps 8; the cells rather long, white on their upper part with 8 long white spicula in the margin. The polyps white, with a slight reddish tint, and the tentacles as also their filaments, furnished with a row of rose-red spicula[1]). The color of the stalk is pale yellowish-red; the other part of the sea-pen, fine rose-red.

This variety differs from the proper aculeata chiefly: 1. by its having a more robust structure; 2. by the zooids on the ventral surface standing closer together and not attaining to nearly the length of the spines of the aculeata; while on the dorsal surface they form more rows and are larger; 3. by the leaves standing closer together, being more numerous, broader and shorter

[1]) In a specimen of aculeata of similar size, the number of leaves was 16; their length 12 Mm. and breadth at the base 2 Mm. The number of polyps 5.

Del er hvid, deres Rand forsynet med hvide Spicler. Forøvrigt er ogsaa Farven forskjellig.

Findested Askevold i Søndfjord paa 30—50 Favne. Vi have kun havt 2 Exemplarer, hvoraf det største, som ovenfor er beskrevet, var fuldvoxent; Bladene indeholdt en Mængde Æg. Det andet var et ganske ungt Exempl., og meget beskadiget i nederste Ende.

PENNATULA DISTORTA, Nob.

(Tab. 11, Fig. 10, 11).

Stokken temmelig rank, bredest paa Midten af den polypbærende Del, smalere nedad, hvor den ender i en conisk Spids, der i levende Live kan antage Kugleformen.

Ventralfladen er forsynet med en Længdefure, paa hvis Sider sees en Mængde Zooider ganske lig dem paa Pennatula phosphorea, L.

Dorsalfladen har ligeledes en Længdefure; paa begge Sider af denne 2—3 Rækker Zooider, der tildels afbrydes af Bladinsertionerne.

Bladene ere lange, smale, dreiede 3—4 Gange om sin Længdeaxe og forsynede med 5—7 Polyper.

Cellerne ere lange, sidde meget spredte, og paa Grund af Bladets Dreining indtage de ikke en enkelt Rad, saaledes som paa P. phosphorea, men staa afvexlende.

Axen er temmelig tynd, næsten traadformig opad, hvor den ender i en liden Anse noget over Midten af Rachis. Nedad bliver den tykkere og gaar næsten lige nedtil Spidsen af Stilken, hvor den ender i en mindst dobbelt saa stor Anse, som foroven.

Farven: Rachis mørkerød; Stilken bleg gulrød. Bladene mørkerøde med blegrøde Spikelrækker efter Længden. Cellerne ligeledes mørkerøde, den øverste Del blegrød, Randen er forsynet med 8 fremragende næsten hvide Spicler.

Polyperne have saavel paa Tentaklerne, som paa deres Traade, blegrøde Spicler.

Findested Askevold i Søndfjord paa en Dybde af 40—50 Favne. I Christianias Museum have vi seet 2 Exemplarer og i Stockholms 1.

Udmaalinger i Millimeter af de to Exemplarer, der have staaet til vor Raadighed.

	A.	B.
Stokkens Længde	102	86
Rachis' do.	62	53
Stilkens do.	40	33
Bladenes do.	25	24
— Bredde ved Basis	1	0,8
— do. paa Midten . . .	0,5	0,5
— Antal	21	19
Cellernes Antal	5-7	5-7
— Afstand	3,5	3,5

Pennatula distorta characteriseres væsentligen ved de om sin egen Axe dreiede, lange, smale Finner, og det ringe Antal Celler, 5—7, der staa afvexlende paa Finnen.

and bearing more polyps; 4. by the upper part of the cells being white, the margin furnished with white spicula. Moreover the color is in other respects different.

It is found at Askevold in Søndfjord 30—50 fathoms. We have only had 2 specimens, of which the largest, above described, was full grown. The leaves contained a great many eggs. The other was a quite young specimen, and somewhat damaged at the lower extremity.

PENNATULA DISTORTA, Nob.

(Tab. 11, fig. 10, 11).

The polypary rather slender, wider in the middle of the polypiferous part, narrower downwards where it terminates in a conical point, which during life may take a globular form.

On the ventral surface is a longitudinal furrow, on the sides of which appear a number of zooids quite like those of Pennatula phosphorea, L.

The dorsal surface has also a longitudinal furrow, and on both sides of it 2—3 rows of zooids, which are partly interrupted by the insertions of the leaves.

The leaves are long, narrow, turned 3—4 times round the longitudinal axis, and bear 5—7 polyps.

The cells are long, far apart and by reason of the twisting of the leaves do not occupy a single row, as in Penn. phosph., but stand alternately.

The axis is rather thin, nearly filiform in the upward direction, in which it ends in a small bend somewhat above the middle of the rachis. In the downward direction it becomes thicker and goes nearly down to the point of the stalk, where it terminates in a bend at least double the size of that at the upper extremity.

Color: rachis, dark-red; the stalk pale yellow-red; the leaves dark-red with pale red rows of spicula running longitudinally; the cells likewise dark-red; the upper part pale red, where the margin is furnished with 8 prominent, nearly white spicula.

The polyps have, as well on their tentacles as on their filaments, pale red spicula.

It is found at Askevold in Söndfjord at a depth of 40—50 fathoms. In the museum at Christiania we have seen 2 specimens and in the museum at Stockholm 1.

Measurements in Millimetres of the two specimens which we have had at our disposal.

	A.	B.
Length of Polypary	102	86
Do. - Rachis	62	53
Do. - Stalk	40	33
Do. - Leaves	25	24
Breadth - Do. at base	1	0,8
Do. - Do. middle	0,5	0,5
Number - Do.	21	19
Number of cells	5—7	5—7
Distance - Do.	3,5	3,5

Pennatula distorta is characterised by its long narrow fins twisted round its own axis, and by the small number of cells 5—7 situated alternately on the fins.

FORKLARING OVER FIGURERNE.

Tab. 11, Fig. 10. Pennatula distorta, naturlig Størrelse.
Fig. 11. En Del af Rachis forstørret. *a* Zooider; *b, b* dreiede Finner; *c, c* Polyper.

PENNATULA PHOSPHOREA, Lin.

Synon. *P. phosph.* variet. lancifolia, Kölliker, l. c. Pag. 131, Fig. 70.

Kölliker udtrykker sig med Hensyn til den af ham opførte Varietet lancifolia saaledes: „Diese Varietät hat bis jetzt wohl allgemein als ächte P. phosphorea gegolten.“ Heri ere vi fuldkommen enige, og ikke ganske skjønne vi, hvorfor denne Varietet er opstillet, da derved Grundtypen aabenbart er forsvunden. Det er imidlertid uundgaaelig nødvendigt at opretholde denne, for derfra at kunne udlede Varieteter, forsaavidt saadanne existere. Vi have derfor i Overensstemmelse med Kölliker opført hans lancifolia som Linné's ægte phosphorea og ladet den være Grundformen; og dette have vi gjort med desto større Sikkerhed, som lancifolia er den almindelige i Norden. Vi have aldrig seet den af Kölliker opførte Varietet angustifolia; men en Mængde af lancifolia og dennes Subvarietet variegata.

PENNATULA PHOSPHOREA VARIET. VARIEGATA.

Synon. *P. phosph.* v. lancifolia subvarietas variegata, Kölliker.

Kölliker angiver, at den største Længde af de Exempl., han havde til Undersøgelse, udgjorde 116 Mm. Det største af vores Exempl. havde en Længde af 195 Mm.; forøvrigt svare alle Characterer til den af ham givne Beskrivelse.

Paa flere Exemplarer af Pennatula phosphorea, Lin. og varietas variegata gik Axen lige op til Enden af Rachis, og paa 4—5 Mm. nær, ned i Stilkens Spidse. Paa 1 Exemplar gik Axen kun ganske lidet op over Midten af Rachis, men gik derimod lige ned i Enden af Stilken.

Findested: I Fjordene omkring Bergen, men ikke almindelig, paa en Dybde fra 40—50 Favne.

VIRGULARIA AFFINIS Nob. [1])

(Tab. 4, Fig. 1—7).

Synon. *Virgularia glacialis*, Sars.
— — *glacialis* } Kölliker,[2]) l. c., Pag. 198—201,
— — *Steenstrupii* } Fig. 116, 117, 128, 129.

[1]) I November 1859 gjorde jeg i Videnskabsselskabet i Christiania opmærksom paa, at Koren havde fra Varangerfjorden faaet en Søfjær, som han allerede i 1855 havde opstillet i Bergens Museum under Navnet „Virg. affinis.“ Nogle Aar senere (1857) fandt Sars og jeg den ved Vadsø. Paa en Etikette havde Sars opført Navnet glacialis for den; men beskrev den aldrig, da han vidste, ikke alene at den tilhørte et Arbeide, Koren og jeg var beskjæftiget med, men at der endog var optaget en detailleret Tegning af den, just den samme, som nu leveres i 3die Hefte af Fauna littor. Norvegiæ. Dette er Grunden til, at Korens oprindelige Navn nu gjenoptages.

D. C. Danielssen.

[2]) Kölliker har antaget dette Navn efter en Etikette i Kjøbenhavner-Museet.

EXPLANATION OF THE FIGURES.

Tab. 11, fig. 10. Pennatula distorta natural size.
Fig. 11. Some of the rachis, magnified. *a* zooids; *b, b* twisted fins; *c, c* polyps.

PENNATULA PHOSPHOREA, Lin.

Synon. *P. phosph.* variet. lancifolia, Kölliker, l. c. pag. 131, fig. 70.

Kölliker expresses himself with respect to this variety lancifolia established by him as follows: "Diese Varietät hat bis jetzt wohl allgemein als ächte P. phosphorea gegolten". With this we quite agree, and do not quite understand why the variety is established, as the typical form would thus disappear. It is however indispensibly necessary to maintain a typical form, in order thence to derive varieties, forasmuch as any such exist. We have therefore, agreeing with Kölliker, placed his lancifolia as Linneus' genuine phosphorea, and retained it as the fundamental form; and we have done this with so much the greater assurance as the lancifolia is the common form in the North. We have never seen the variety angustifolia established by Kölliker, but a number of lancifolia and of the subvariety variegata.

PENNATULA PHOSPHOREA VARIET. VARIEGATA.

Synon. *P. phosph.* v. lancifolia subvarietas variegata, Kölliker.

Kölliker states that the greatest length of the specimens he had for examination was 116 Mm. The largest of our specimens had a length of 195 Mm. In other respects the characters answer to the description given by him.

In many specimens of Pennatula phosphorea, Lin. and varietas variegata, the axis went right up to the end of the rachis, and within 4—5 Mm. of the point of the stalk. In one specimen the axis went only a little way above the middle of the rachis, but to the very end of the stalk.

It is found in the fjords round about Bergen but not abundantly, at the depth of 40—50 fathoms.

VIRGULARIA AFFINIS, Nob. [1])

(Tab. 4, fig. 1—7).

Synon. *Virgularia glacialis*, Sars.
— — *glacialis* } Kölliker,[2]) l. c., p. 198—201,
— — *Steenstrupii* } fig. 116, 117, 128, 129.

[1]) In November 1859 I called the attention of the scientific society in Christiania to the fact that Koren had got from the Varangerfjord a sea-pen which he had already in 1855 placed in the Museum at Bergen under the name "Virg. affinis". Some years afterwards (1857) Sars and I found it at Vadsö. Sars had written for it the name glacialis on a ticket, but never described it; as he knew, not only that it belonged to a work with which Koren and I were occupied, but also that it had been delineated in detail in the said work exactly as now published in Tom. 3 of Fauna littor. Norveg. This is why Koren's original name is now again adopted.

D. C. Danielssen.

[2]) Kölliker has adopted this name from a ticket in the Copenhagen museum.

Polypstokkens hele Længde er 580 Mm., hvoraf den sterile Del udgjør 200 Mm., den polypbærende 380 Mm. Rachis er lige, stiv, og paa den øverste Ende rager Axen 10 Mm. over Sarcosomaet [1]). Stilken er temmelig bøielig, aftager efterhaanden i Tykkelse, udvider sig derpaa, bliver tenformig og ender i en stump Spids (Tab. 4, Fig. 1).

Cellerne ere conisk tilspidsede og sammenvoxede fra Basis til Spidsen, hvorved Finnen (Bladet) dannes. Omtrent den nedre Halvdel af Finnernes indvendige Flade er fastvoxet til Rachis, hvilket gjør, at Finnen ligger tæt tilsluttet til Stokken. Paa Finnens ydre Flade, lidt under dens Midtparti, sees en yderst svag Sammensnøring, der svarer til det Sted, hvor Sammenvoxningen paa den indre Flade ophører. Finnerne sidde afvexlende i en temmelig skraa Retning paa Stokken, saaledes nemlig, at de med deres bredeste Del gaa fra Bugfladen fortil og opad mod Dorsalfladen, hvor de blive meget smale og skilles fra de paa den modsatte Side tilstødende kun ved en fin Linie (Fig. 2, 3). Den underliggende Finnes øverste Rand støder til Grunddelen af den ovenfor siddende, hvorved der næsten intet Mellemrum er at se.

I levende Tilstand derimod kan Finnen bevæges noget ud fra Stokken, og da fremkommer et Mellemrum af omtr. 2 Mm.'s Bredde, hvilket næsten ganske er besat med Zooider. Disse fortsætte sig over paa Dorsalfladen langs den førbeskrevne Linie, hvor de staa til Slutning i kun én Række (Fig 2, 3, c, c). Finnernes Antal paa 50 Mm. af Stokkens Længde udgjør 14 Par.

Cellerne have en cirkelrund Aabning, ere ialmindelighed 10, yderst sjelden derover; de største, der vende mod Bugfladen, ere 3 Mm. lange, og de mindste, der indtage Midten af Dorsalfladen, ere 1 Mm. Polyperne have en temmelig kort cylindrisk Krop med noget tykke Tentakler, der ere forsynede med mange Traade, og kunne fuldstændig trækkes ind i Cellerne. (Fig. 6).

Rachis er paa Bugfladen nøgen og forsynet med en dyb Fure. (Fig. 5).

Axen er rund, traadformig, tykkest i den øverste, tvers afskaarne Ende, hvorimod den i den nederste Del er haarformig, og ender i en lille Krog (Fig. 7).

Stokken er chamoisfarvet i levende Live; Cellerne og Polyperne bleggule.

Findested: Først er den funden af Districtslæge Fleischer i Varangerfjord; nogle Aar senere paa samme Localitet af Sars og Danielssen i en Dybde af 60—100

[1]) Herklots og flere med ham have antaget, at Grunden til at Axen i den øverste Ende er blottet, hidrører fra en Contraction af Sarcosomaet, som Følge af Opbevaringsvædsken; dette forholder sig ikke saa. Tvertom ere vi overbeviste om, at dette er en naturlig Tilstand, og ikke fremkaldt ved Contraction af Sarcosomaet. Saavel paa denne Art, som paa flere andre Slægter og Arter viste samtlige Exemplarer i levende Live den samme nøgne Axe, ligesom at Sarcosomaet var fastvoxet til det Sted, hvor Axen begynder at blive blottet. Paa et Exemplar saa vi endog flere Serpulaer fæstede til den nøgne Del. (Se Fig. 3 d).

The whole length of the polypary is 580 Mm. of which the sterile part 200 and the polypiferous 380 Mm. The rachis is straight and stiff and at the upper end the axis projects 10 Mm. beyond the sarcosoma [1]). The stalk is rather flexible, diminishing gradually in thickness, then becoming enlarged and fusiform, and terminating in a blunt point (see tab. 4, fig. 1).

The cells are conically pointed, and connate from the base to the point, whereby the fin (the leaf) is formed. About the lower half of the interior surface of the fin is connate with the rachis which causes the fin to lie close in to the polypary. On the exterior surface of the fin, a little below the middle, appears an extremely slight constriction corresponding to the place where the attachment of the interior surface ceases. The fins are situated alternately in a rather oblique direction on the polypary, so that with their broadest part they extend from the ventral surface forward and upward to the dorsal surface, where they become very narrow, and are only separated from those on the opposite side by a fine line (see fig. 2, 3). The upper margin of the underlying fin meets the basal part of that situated above it, so that scarcely any interval appears.

In the living state the fins can move a little outwards from the polypary, and then there appears an interval of about 2 Mm. width, nearly entirely covered with zooids. These are continued onto the dorsal surface along the line previously described, where they stand at last in only one row (see f. 2, 3, c, c). The number of the fins at 50 Mm. of the length of the polypary makes 14 pairs.

The cells have a circular opening, and are usually 10, very seldom more; the largest, turned towards the ventral surface, are 3 Mm. long; and the smallest, which occupy the middle of the dorsal surface, 1 Mm. The polyps have a rather short cylindrical body with somewhat thick tentacles bearing many filaments, and susceptible of being drawn completely into the cells. (see fig. 6).

The rachis is on the ventral surface naked, and has a deep furrow (see fig. 5).

The axis is round, filiform, thickest at the upper truncated extremity, while the lower part is capillary and terminates in a little hook (see fig. 7).

The polypary is of a chamois color during life. The cells and the polyps pale yellow.

Habitat. It was found first by Mr. Fleischer district surgeon in the Varangerfjord; some years afterwards in the same locality by Sars and Danielssen, at a depth of

[1]) Herklots and several others have presumed that the reason of the axis being bare at the upper end, is to be sought for in a contraction of the sarcosoma under the influence of the preserving liquid; this is however not the case; on the contrary, we are convinced that it is a natural state, and not produced by any contraction of the cænenchym. As well in this species as in many other genera and species, all the specimens exhibited during life the same bare axis and likewise the sarcosoma connate with (attached by growth to) the axis at the place where the axis begins to be bare. In one specimen, we even saw several serpulæ attached to the bare part (see fig. 3 d).

Favne, lerholdig Bund. Den var temmelig almindelig i Varangerfjorden, ganske i Nærheden af Vadsø. Alle Exemplarer vare mere eller mindre afbrækkede med Undtagelse af ét, der væsentlig har tjent os til Tegning og Beskrivelse.

Virgularia affinis characteriseres saaledes:

Polypstokken lige, stiv, og paa dens øverste Ende er Axen nøgen. Ventralfladen forsynet med en bred og dyb Fure. Finnerne sidde afvexlende tæt sammen, ere høiest mod Bugfladen og aftage successivt mod Midten af Dorsalfladen, hvor de ende i en Spids. Omtrent den nederste Halvdel af deres indre Væg er fastvoxet til Rachis. Cellerne almindeligst 10, sammenvoxede efter deres hele Høide (Længde). Zooider laterale i stor Mængde imellem Finnerne, yderst sparsomme paa Rygsiden. 14 Par Finner paa 50 Mm. af Rachis's Midtparti.

FORKLARING OVER FIGURERNE.

Tab. 4, Fig. 1. Virgularia affinis i naturlig Størrelse. *a* den tenformige Del; *b* den nøgne Axe.

Fig. 2. Et Stykke af Rachis med Finner og Polyper, seet fra Rygsiden, — forstørret. *a* Finner; *b* Polyper; *c* Zooider.

Fig. 3. Det øverste Stykke af Polypstokken med den nøgne Axe, seet fra Rygsiden, — forstørret. *a* Finner; *b* Polyper; *c* Zooider; *d* Serpulaer.

Fig. 4. Et Stykke af Polypstokken, seet fra Siden, — forstørret. *a* Finnen; *b* Polyper; c Zooider.

Fig. 5. Et Stykke af Polypstokkens Bugside, — forstørret. *a* Finner; *b* Polyper; *c* Zooider.

Fig. 6. Polyper og Celler, — forstørrede. *a* Celler; *b* Polyper; *c* Tentakler.

Fig. 7. Axen i naturlig Størrelse. *a* den tversafskaarne øverste Ende; *b* den krogformige nederste Ende.

SLÆGTEN *DÜBENIA*, Nob. [1])

SLÆGTSCHARACTEREN.

Habitus nærmer sig Stylatula. Stilken forsynet med Endeblære. Rachis har en temmelig lang, lateral Zooidstribe, samt radiære Kanaler, udgaaende saavel fra Dorsal- som Ventralkanalen og dannende nærmest Finnen en svag Vulst paa Dorsal- og Ventralfladen. Finnerne rudimentære, støttes af en Kalkplade, sammensat af kortere og længere Kalknaale, der rage langt op over den rudimentære Finne. Polyperne uden Celle, lange, cylindriske, der vanskelig sammentrække sig, men sammenvoxede ved Grunddelen. Kjønsorganerne i de fuldtudviklede Polypers hypogastriske Hule. Zooiderne laterale. Axen rund med talrige radiære Fibre.

NÆRMERE CHARACTERISTIK AF SLÆGTEN.

Stilken ender i en tydelig Blære, der er forsynet med en Grube, som er omtr. et Par Mm. dyb, Rachis

[1]) I vore foreløbige Meddelelser over Pennatuliderne (se Magazin for Naturvidenskaberne 1874) have vi benævnt en ny Slægt Batea; men senere ere vi blevne opmærksomme paa, at dette Navn allerede var optaget af Fritz Müller for en Crustacé-Slægt, hvorfor vi nu have forandret det til Dübenia, og derved opkaldt vor Ven, den fortidlig afdøde og dygtige Naturforsker, Magnus von Düben.

60—100 fathoms on clayey bottom. It was rather abundant in the Varangerfjord, quite in the neighborhood of Vadsö. All the specimens were more or less broken, excepting one which has chiefly been used for our drawings and description.

Virgularia affinis is characterised as follows:

The polypary straight and stiff, having the axis at its upper end bare. The ventral surface has a broad and deep furrow. The fins are placed alternately, close together; they are highest towards the ventral surface, and diminish successively towards the dorsal surface, where they terminate in a point. About the lower half of their interior wall is connate with the rachis. The cells usually 10 connate in their whole height (length). Zooids lateral, in great numbers between the fins, extremely rare on the dorsal side; 14 pairs of fins in 50 Mm. of the middle part of the rachis.

EXPLANATION OF THE FIGURES.

Tab. 4, fig. 1. Virgularia affinis, natural size. *a* the fusiform part; *b* the bare axis.

Fig. 2. A piece of the rachis with fins and polyps seen from the dorsal side magnified. *a* fins; *b* polyps; *c* zooids.

Fig. 3. The upper part of the polypary with the bare axis viewed from the dorsal side, magnified. *a* fins; *b* polyps; *c* zooids; *d* serpulæ.

Fig. 4. A part of the polypary seen from the side, magnified. *a* fins; *b* polyps; *c* zooids.

Fig. 5. A part of the ventral side of the polypary magnified. *a* fins; *b* polyps; *c* zooids.

Fig. 6. Polyps and cells magnified. *a* cells; *b* polyps; *c* tentacles.

Fig. 7. The axis, natural size. *a* the truncated upper extremity; *b* the hook-shaped lower extremity.

GENUS *DÜBENIA*, Nob. [1])

GENERIC CHARACTERS.

The habitus has some resemblance to the Stylatula. The stalk furnished with a terminal bladder. The rachis has a rather long lateral band of zooids, and radial canals issuing as well from the dorsal as from the ventral canal, and forming close to the fins a slight swelling on the dorsal and ventral surfaces. The fins are rudimentary and supported by a calcareous plate composed of shorter or longer calcareous needles, which project far up beyond the rudimentary fin. The polyps without cells, long, cylindrical and not easily contractile, connate at the basal part. The sexual organs, in the hypogastric cavity of the fully developed polyps. The zooids lateral. The axis round with numerous radial fibres.

MORE PARTICULAR *CHARACTERISTICS* OF THE GENUS.

The stalk ends in an evident bladder, which has a depression about 2 Mm. deep. The rachis has a lateral

[1]) In our preliminary communications concerning the Pennatulidæ (Magazin for Naturvidenskaberne 1874) we have named a new genus Batea; but we have subsequently become aware that this name had been already taken up by Fritz Müller for a genus of Crustaceæ; for which reason we have changed the name to "Dübenia", thereby remembring our prematurely deceased friend, the equally talented and amiable Naturalist Magnus von Düben.

har en lateral Zooidstribe, der er temmelig lang og fortsætter sig opad i de rudimentære Finner, som i Begyndelsen fremtræde som svage Tverlinier paa hver Side af Stokken, men blive alt høiere og høiere jo længere de komme op paa Rachis, indtil den rudimentære Finne er dannet. De rudimentære Finner dannes derved, at Polypernes Grunddel er paa Siderne sammenvoxet, saaledes at begge de ydre Polypers udvendige Vægge ere frie og gaa umiddelbart over i Sarcosomaet. Naar derfor kun 2 Polyper staa sammen, existerer aldeles ingen Finne; thi da ere disse Polyper sammenloddede ved deres indvendige Flader lige nede ved Basaldelen, strax efter at de træde ud af Sarcosomaet. De have Udseende som om de sidde umiddelbart paa Rachis. Ere 3 Polyper grupperede sammen, bliver ved den omtalte Sammenvoxning en Slags Finne dannet; men dog væsentlig forskjellig fra den, som findes hos Slægterne Virgularia og Stylatula. Denne rudimentære Finne, ligesom Polypgrupperne, støttes af en Kalkplade, der kun lidet afviger fra den, der findes hos Stylatula.

Saavel paa Ventral- som Dorsalfladen findes temmelig tydelige Vulster, som især ere iøinefaldende i Nærheden af Polyperne og fremkomme ved de radiære Kanaler.

Zooiderne ere altid laterale, men strække sig mere over paa Dorsalfladen, hvor de som oftest danne flere Rækker (Tab. 3, Fig. 3 b, 5 b).

Den indre Bygning er ogsaa noget afvigende fra de nærstaaende Slægter.

Stilkens Endeblære, ligesom hele den pulpøse Del er forsynet med Længdemuskler, der baade ere i rigelig Mængde tilstede og stærkt udviklede. Circulære eller Tvermuskler findes ikke. Septum transversale har vel et Centrum, der er optaget af Saftkanaler (Tab. 12, Fig. 2 l″); men ingen Stræng, som Kölliker anfører hos Virgularierne. Saavel i Huden, som i Sarcosomaet ere Kalkkorn indsprængte, og i den øverste Del af Stilken findes hist og her Kalknaale.

Slægten Dübenia har ligesom de øvrige Virgulariner 4 Længdekanaler (Tab. 10, Fig. 9 d, v, S, S), som dog i Stilkens nederste Del smelte sammen til 2, en Ventral- og en Dorsalkanal (Tab. 12, Fig. 2 v, d), i denne sidste ender Axen. Foruden disse 2 Kanaler findes i den øverste Del af Stilken og i hele Stokken 2 Sidekanaler (Tab 10, Fig. 9 s, s), der ere smalere end de to foregaaende. Disse 4 Kanaler omgive Axen. Fra Dorsal- og Ventralkanalen udgaa mange radiære Kanaler (Tab. 10, Fig. 11 rd, rd, rv, rv), der ikke alene correspondere med Polyperne (Tab. 12, Fig. 1 rv, rv, rv), men ogsaa danne ved Roden af hver Polypgruppe (den rudimentære Finne) en Vulst saavel mod Ventral- som Dorsalfladen (Tab. 10, Fig. 10 rv, rd). Foruden disse Kanaler findes et tæt longitudinelt Kanalsystem (Tab. 12, Fig. 1 l), der med Tvergrene anastomosere med hinanden indbyrdes og har Forbindelsesgrene med Ventral- og Dorsalkanalen (Tab. 12, Fig. 2 l;

band of zooids which is rather long and is continued upwards in the rudimentary fins, which latter appear at first as faint transverse lines on each side of the polypary, but become higher and higher the further they advance on to the rachis until the rudimentary fin is formed. The rudimentary fins are formed by the basal part of the polyp being connate on the sides; so that both the outward walls of the exterior polyps are free, and go immediately over into the sarcosoma. When therefore only 2 polyps stand together, no fin at all exists; for then these polyps are soldered together by their interior surfaces right down to the basal part, just as they issue from the sarcosoma. They have the appearance of being situated immediately on the rachis. When 3 polyps are grouped together, a sort of a fin is formed by the attachment described, but yet essentially different from that which exists in the genera Virgularia and Stylatula. This rudimentary fin, as also the groups of polyps, is supported by a calcareous plate which only in a slight degree differs from that found in the Stylatula.

As well on the ventral as on the dorsal surface there are distinct swellings, which are especially remarkable in the vicinity of the polyps, and produced by the radial canals.

The zooids are always lateral, but extend more over on the dorsal surface, where they most frequently form several rows (Tab. 3, fig. 3 b, 5 b).

The interior structure is also somewhat different from that of allied genera.

The terminal bladder of the stalk, like all the pulpous part, has longitudinal muscles, which both exist in abundant number and are strongly developed; circular or transverse muscles are not found. The septum transversale has indeed a centre which is occupied with sap-canals (Tab. 12, fig. 2 l″), but no chord, as (noticed by Kölliker) in the Virgularia. As well in the skin as in the sarcosoma, there are calcareous granules scattered; and in the upper part of the stalk, there are here and there calcareous needles.

The genus Dübenia has, like the other Virgularieæ, 4 longitudinal canals, (Tab. 10, fig. 9 d, v, S, S) which however in the lower part of the stalk are united in 2, a ventral and a dorsal canal (Tab. 12, fig. 2 v, d) and in the latter the axis ends. Besides these 2 canals, there are in the upper part of the stalk and in the whole polypary, 2 lateral canals (Tab. 10, fig. 9 s, s) which are narrower than the 2 previous. These 4 canals surround the axis. From the dorsal and ventral canals there proceed many radial canals (Tab. 10, fig. 11 rd, rd, rv, rv) which not only correspond with the polyps (Tab. 12, fig. 1 rv, rv, rv) but also form at the root of each group of polyps (the rudimentary fin) a swelling as well towards the ventral as towards the dorsal surface (Tab. 10, fig. 10 rv, rd). Besides these canals, there is a compact longitudinal system of canals (Tab. 12, fig. 1 l) anastomosing by transverse ramifications with each other and commu-

Fig. 3). I Rachis findes ingen Muskler; Sarcosomaet er her forsynet med større og mindre Kalkspicler.

Kjønsorganerne udvikles i den hypogastriske Hulhed hos de fuldt udviklede Polyper, og Æggene udfylde ikke alene denne, men ogsaa de epigastriske Rum, ja indtil Tentakel-Hulhederne. Den rudimentære Finne er forsynet med talrige capillære Ernæringskanaler, der anastomosere med hverandre (Tab. 10, Fig. 10 f).

Saavel Længdekanalerne som Ernæringskanalerne ere beklædte med Epithel, som opfylder ganske de fineste capillære Saftkanaler (Tab. 10, Fig. 13).

Axen har en temmelig stor Centralkjerne, der har en kornet Structur. Dens fibrøse Grundsubstants er straalet, Radierne ere bredest i Peripherien, ende spids mod Centret og danne derved Prismer, der ere ganske forkalkede, ligesom hos Halisceptrum (Tab. 10, Fig. 9, 12).

Omkring Axen findes en elastisk, hyalin Membran (Cuticula) (Tab. 10, Fig. 10 a, c), der slutter sig saa tæt til Skedens indre Væg, at den hyppig følger med denne ved Forsøg paa at separere den fra Axen.

I denne Membran sees en utallig Mængde runde Felter, som ligge temmelig regelmæssigt nær hinanden og dannes af en Fortykkelse af selve Membranen. Disse Felter ere optagne af yderst fine Kalknaale (Tab. 10, Fig. 12 c). Imellem disse Felter løbe en stor Mængde aabne capillære Saftkanaler (Tab. 10, Fig 12 p), der blive lukkede ved at den indre Flade af Membranen slutter sig til Axen. Disse Kanaler indeholde et finkornet Fluidum. Skeden bestaar af to Membraner, hvorimellem en sarcomatøs Substants, der er særdeles rig paa Ernæringskanaler.

DÜBENIA ABYSSICOLA, Nob.

(Tab. 10 og 12, Fig. 1—3).

ARTSCHARACTER.

Polypstokken indtil 314 Mm. lang, slank, cylindrisk og noget stiv. Rachis omtrent $2^1/_2$ Gang saa lang som Stilken. Polyperne staa vidt fra hverandre, 3, sjelden 4, paa hver Finne, og ere forsynede med en Række Spicler paa hver Side af Kroppen. Kalkpladen indtager hele Finnens Bredde, dannes af korte og lange Spicler, hvoraf de længste, 9 i Tallet, have 3 Mm.'s Længde. Stokkens Farve gulrød. Polypernes brunrød.

Polypstokken cylindrisk, slank, noget stiv, og paa dens øverste tvers afskaarne Ende er Axen nøgen i en Strækning fra 5—20 Mm. paa de voxne Exemplarer, hvorimod den paa yngre Individer er bedækket af Sarcosomaet. Den sterile Stilk er tenformig og ender almindelig i en stump Spids, paa hvis Ende der findes en liden Grube, som ender blindt i et Par Mm.'s Høide. Aabningen for denne Grube udvider og sammentrækker sig. Denne

nicating with the ventral and dorsal canal (Tab. 12, fig. 2 l; fig. 3). In the rachis, there are no muscles; the sarcosoma contains larger and smaller calcareous spicula.

The sexual organs are developed in the hypogastric cavity in the fully developed polyps; and the ova fill not only this cavity, but also the epigastric space, nay even the tentacular cavities. The rudimentary fin has numerous capillary alimentary canals anastomosing with each other (Tab. 10, fig. 10 f).

As well the longitudinal canals as the alimentary canals, are covered with epithelium which entirely fills up the finest capillary sap-canals (Tab. 10, fig. 13).

The axis has a rather large central nucleus of a horny structure. Its fibrous fundamental substance is radiated; the radii are broadest at the periphery, terminating in points at the centre, and forming thereby prisms which are quite calcined, as in the Halisceptrum (Tab. 10, fig. 9, 12).

Around the axis there is an elastic hyaline membrane (cuticula). (Tab. 10, fig. 10 a, c) flitting so closely to the inner wall of the sheath that it frequently comes away with it when an attempt is made to separate it from the axis.

In this membrane there appear innumerable round spots lying rather regularly near to each other, and formed by a thickening of the membrane itself. These spots are occupied by extremely fine calcareous needles (Tab. 10, fig. 12 c). Between these spots there run a great many open capillary sap-canals (Tab. 10, fig. 12 p) which are closed by the interior surface of the membrane coming in contact with the axis. These canals contain a finely granulated fluid. The sheath consists of two membranes, between which is a sarcomatous substance abundantly supplied with alimentary canals.

DÜBENIA ABYSSICOLA, Nob.

(Tab. 10 and 12, fig. 1—3).

SPECIES CHARACTER.

The polypary up to 314 Mm. long, slender, cylindrical and somewhat stiff. The rachis about $2^1/_2$ times as long as the stalk. The polyps are situated far apart from each other, 3, rarely 4, on one fin, and have a row of spicula on each side of the body. The calcareous plate occupies the whole width of the fin, and is formed of short and long spicula of which the longest, 9 in number, have a length of 3 Mm. The color of the polypary is yellowish red. The color of the polyps is brown-red.

The polypary is cylindrical, slender and somewhat stiff; and at its upper truncated end, the axis is bare to the extent of 5—20 Mm. in full grown specimens; while in younger individuals it is covered by the sarcosoma. The sterile stalk is fusiform, and terminates usually in a blunt point, at the end of which there is a little pit about 2 Mm. deep. The aperture of this pit expands and contracts itself. This sterile part is strongly contractile, and

sterile Del er stærkt contractil, og ofte antager den nederste Ende en Blæreform. Den polypbærende Stilk er 2½ Gang saa lang, som den polypløse. Polyperne ere 3—4 Mm. lange, cylindriske, smale, ved deres Basaldel sammenvoxede, saa at derved opstaar en Slags Finne, der kan betragtes som rudimentær (Tab. 10, Fig. 3 a), ikke over 0,5 Mm. høi og danner paa Sarcosomaet kun en ringe Fremstaaenhed, hvorfra Polyperne, der ialmindelighed ere 3, sjelden 4 i Antal, udspringe. Paa Grund af Finnens ringe Høide ser det ud, som om Polypen springer ud fra selve Sarcosomaet, og naar den er sammentrukken, hvilket sker paa den Maade, at først trækker den nederste Del af Kroppen sig sammen, og derefter indkrænges Tentaklerne, saa ser man en liden Knop paa Stokken, hvilken kan antage en forskjellig Form, stundom næsten Kugleformen, stundom Ægformen (Tab. 10, Fig. 3 d). Naar Polypen saaledes er sammentrukken, rager Kalkpladens længere Spicler langt over den. Polyperne staa vidt fra hverandre, have temmelig lange Tentakler, der paa deres aborale Flade ere forsynede med Spicler, som gaa lige til Tentakelspidsen og strække sig lidt ned paa Kroppen (Tab. 10, Fig. 4, 5). Denne har desforuden 1 stundom 2 Rækker Spicler (nemlig 1 paa hver Side), hvilke sjelden indtage Kroppens hele Længde. Disse Spicler ere meget robustere, kortere og mere afstumpede end de, der findes paa Tentaklerne (Tab. 10, Fig. 4 a og Fig. 6). Finnerne sidde afvexlende, dog saaledes, at medens de paa Midten og den nederste Del af Rachis næsten sidde hinanden modsat, ere de meget afvexlende paa dennes øverste Del. De ere som oftest convergerende mod Dorsalfladen, hvor de støde næsten til hinanden, men vige fra hinanden paa Bugfladen, saa at denne er blottet i en smal Stribe.

De rudimentære Finner støttes af en Kalkplade, der er sammensat af korte og lange Spicler, og som tager sin Begyndelse med en Spids fra Stokken, strax under Finnen, indtager dennes Bredde og rager med sine lange Spicler, hvoraf der hyppigst ere 9, frit op dels imellem Polyperne, dels paa deres Krop. Paa Midten af Stokken sidde Finnerne temmelig langt fra hverandre indtil 5 Mm.'s Afstand, længere nede blive Mellemrummene mindre, indtil de næsten ganske forsvinde der, hvor de unge Polyper begynde. Imod den nederste Ende af Rachis aftage Finnerne betydeligt i Størrelse, danne Tverrader med 3 Polyper, saa komme 2 Polyper og endelig blot 1 Polyp. Nedenfor denne sees en lang Stribe af Zooider (Lateralzooidstriben).

Paa de ældre Individer findes over Finnerne en Samling Zooider, der udgaa fra hver Side af Stokken, hvor de danne en smal ophøiet Liste, og støde sammen i en større eller mindre Gruppe paa Dorsalfladen (Tab. 10, Fig. 3 c). Disse Zooider kunne dog være meget sparsomme ved enkelte Finner, ligesom Tilfældet altid er paa yngre Exemplarer, hvor de kun staa enkeltvis og ere saa smaa, at de endog vanskeligen kunne sees ved Hjælp af en stærk Loupe. Saavel paa Dorsal- som Ventralfladen af Rachis sees i Nærheden af Finnerne en svag Vulst, der har en forskjellig

the lower part of it often assumes the form of a bladder. The polypiferous stalk is 2½ times as long as the sterile part. The polyps are 3—4 Mm. long, cylindrical, narrow and connate at their basal part so as to form a sort of fin which may be considered as rudimentary (Tab. 10, fig. 3 a) not more than 0,5 Mm. high and causing only a slight protuberance on the sarcosoma from which the polyps, usually 3, rarely 4 in number, issue. On account of the inconsiderable height of the fin, the polyps appear to proceed from the sarcosoma itself; and when it is contracted, which takes place by the lower part of the body being first drawn together, and then the tentacles invaginated, a small knob appears on the polypary and may assume different forms, being sometimes nearly globular and sometimes oval (Tab. 10, fig. 3 d). When the polyp is thus contracted, the longer spicula of the calcareous plate project far beyond it. The polyps are situated far apart from each other; they have rather long tentacles, which on their aboral surface have spicula reaching right up to the point of the tentacles and extending a little way down on to the body (Tab. 10, fig. 4, 5). The body has besides, 1, sometimes 2 rows of spicula (namely 1 on each side) which seldom occupy the whole length of the body. These spicula are much stouter, shorter and terminate more obtusely than those which are found in the tentacles (Tab. 10, fig. 4 a and fig. 6). The fins are situated alternately, but so that, while in the middle and lower part of the rachis they are nearly opposite to each other, they are quite alternate in the upper part. They are usually convergent towards the dorsal surface, where they nearly touch, but diverge towards the ventral surface, so that a narrow band of this surface is bare.

The rudimentary fins are supported by a calcareous plate, composed of short and long spicula, beginning in a point from the polypary just below the fin, occupying the whole breadth of the fin, and projecting with its long spicula, of which there are usually 9, freely upwards, partly between the polyps and partly on their body. In the middle of the polypary the fins are situated rather far from each other, as far as 5 Mm. apart; lower down the intervals are smaller, until they nearly disappear where the young polyps begin. Towards the lower end of the rachis the fins diminish considerably in size and form transverse rows with 3 polyps; then come 2 polyps and finally only 1 polyp. Below there appears a long band of zooids (the lateral zooid-band).

In elder specimens there is above the fins a collection of zooids proceeding from each side of the polypary, where they form a small raised border and meet in a larger or smaller group on the dorsal surface (Tab. 10, fig. 3 c). These zooids may yet be very scarce on some fins, as is the case always in younger specimens, where they only stand singly and are so small that they are not easily visible, even with the help of a strong magnifying glass. As well on the dorsal, as on the ventral surface of the rachis, there appears, in the vicinity of the fins, a slight swelling

Længde, men strækker sig aldrig fra den ene Finne til den anden. Polypstokken er forsynet med Spicler, der tildels danne lange Rækker. Axen gaar ikke lige ned til Enden af Stokken, men ophører omtr. 5 Mm. ovenfor paa ældre Individer, medens den paa yngre gaar næsten lige ned til Spidsen. Den er fra 0,5 Mm. til 1 Mm. tyk og bliver nedad alt tyndere og tyndere, indtil den ender i en haarformig Krog.

Farven: Polypstokken er svag gulrød med lidt mørkere Finner. Polyperne lys brunrøde med chamoisfarvede Tentakler, der paa Midten af den aborale Flade have en brunrød Længdestribe. Omkring Mundaabningen en mørkebrun Ring. Maven er stærk brun, og naar Polypen er noget sammentrukken, næsten sort.

Findested: Ramsfjord tæt ved Alværstrømmen, to Mile fra Bergen, hvor den først fandtes af Musedirektør, Kjøbmand Herman Friele paa en Dybde af 100—120 Favne, lerholdig Sandbund. Paa enkelte Localiteter synes den her at staa i Mængde.

Professor G. O. Sars har fundet den i Lofoten.

Udmaalinger af forskjellige Exemplarer i Millimeter:

	A.	B.	C.	D.
Stokkens hele Længde	314	280	185	76
Rachis	224	206	140	61
Stilk	90	74	45	15
Finnernes Antal . . .	80	72	52	27

DÜBENIA ABYSSICOLA VARIETAS SMARAGDINA, Nob.

(Tab. 10, Fig. 7, 8).

Denne Søfjær ligner i Formen abyssicola, men er noget finere i Bygning og adskiller sig væsentlig fra denne derved, at i Regelen ere kun to Polyper stillede sammen, og da findes ingen Finne. Polypernes Basaldele ere nemlig ved deres indvendige Sider sammenvoxede i en Høide af 0,5 Mm., medens deres udvendige Sider gaa umiddelbart over i Sarcosomaet. Undtagelsesvis staa 3 Polyper sammen, og da sees en yderst liden Finne. Polypgrupperne, eller Finnerne hvor de findes, staa længere fra hverandre. Farven paa Stokken er gulhvid med et grønligt Skjær, og Polyperne smaragdgrønne med næsten hvide Tentakler og mørke Maver.

Vi have været i Tvivl om, hvorvidt denne Søfjær er en distinct Art eller blot en Varietet; thi baade Farven, som hos Pennatuliderne pleier at være constant, og Polypernes Antal ere forskjellige fra den typiske abyssicola. Imidlertid ere vi dog blevne staaende ved at optage den som en udpræget Varietet.

Den er funden paa de samme Localiteter, som den forrige, men er sjeldnere.

Udmaalinger af 2 Exemplarer:

	A.	B.
Stokkens hele Længde	268	200
Rachis	197	148
Stilk	71	52
Polypgruppernes Antal	54	44

of various length, but never extending from one fin to the other. The polypary contains spicula which partly form long rows. The axis does not go quite to the lower end of the polypary, but terminates in older specimens about 5 Mm. above the extremity, while in younger specimens it extends very nearly to the point. It is from 0,5 Mm. to 1 Mm. thick, and becomes thinner and thinner downwards, until it ends in a hair-shaped hook.

Color: The polypary is pale yellow-red with darkish fins. The polyps light brown-red with chamois-colored tentacles, which in the middle of the aboral surface have a brown-red longitudinal stripe. Round the bucal aperture, a dark-brown ring. The stomach is intensely brown, and, when the polyp is contracted, nearly black.

Habitat: Ramsfjord close to Alværströmmen, two miles from Bergen, where it was first found by Mr. Herman Friele, merchant and director of the museum, at the depth of 100—120 fathoms on clayey sand bottom. In some localities here it seems to be very abundant.

Mr. G. O. Sars, Professor of the Christiania university has found it in Lofoten.

Measurements of various specimens in Millimètres:

	A.	B.	C.	D.
Total length	314	280	185	76
Rachis	224	206	140	61
Stalk	90	74	45	15
Number of fins . . .	80	72	52	27

DÜBENIA ABYSSICOLA VARIETAS SMARAGDINA, Nob.

(Tab. 10, fig. 7, 8).

This sea-pen resembles in form the abyssicola, but is much more delicate in structure, and differs chiefly by having only 2 polyps placed together, and by having no fins. The basal parts of the polyps are interiorly connate to a height of 0,5 Mm. while their exterior sides merge immediately into the sarcosoma. Exceptionally 3 polyps stand together; and then an extremely small fin appears. The groups of polyps, or the fins where they exist, stand further from each other. The color of the polypary is yellowish white with a greenish tint; and the polyps are emerald green with almost white tentacles and dark stomachs.

We have been in doubt as to this sea-pen being a distinct species or only a variety; for not only is the color, which is usually constant in the Pennatulidæ, different, but also the number of the polyps is different from that of the typical abyssicola. We have however decided on adopting it as a marked variety.

It is found in the same localities as the former, but is rarer.

Measurements of 2 Specimens.

	A.	B.
Total length	268	200
Rachis	197	148
Stalk	71	52
Number of groups of polyps	54	44

DÜBENIA ELEGANS, Nob.

(Tab. 3, Fig. 1—7).

Synon. *Virgularia elegans,* D. Videnskabsselskabets Forhandlinger i Christiania 1859, p. 251.
— *Stylatula elegans,* Richiardi, l. c. p. 73.
— *Styl. elegans,* Kölliker, l. c. P. 225, Fig. 137—138.

I Videnskabsselskabet i Christiania har den ene af os i 1859 anmeldt en ny Art, nemlig Virgularia elegans, som vi allerede dengang antog kom til at danne en ny Slægt. Da lang Tid er hengaaen siden denne Anmeldelse fandt Sted, har den amerikanske Naturforsker Verrill imidlertid opstillet lignende Former fra Kalifornien under Slægtsnavnet Stylatula, hvortil Richiardi har henført denne vor Søfjær. Men da den i flere væsentlige Charactermærker afviger fra Stylatula, og dertil fuldkommen stemmer overens med den af os opstillede Slægt Dübenia, maa den henføres til denne.

Destoværre ere alle de Exemplarer, vi have fundet, større og mindre Stykker, hvilket hindrer os fra at levere en ganske fuldstændig Beskrivelse; det væsentligste kunne vi dog fremhæve.

Det største Stykke af den polypbærende Stok, som vi fandt, er 275 Mm. langt, og har endnu paa sin nederste Del temmelig store Polyper (Tab. 3, Fig. 1). Paa den øverste Del ragede Axen omtr. 8 Mm. over Sarcosomaet.

Stokken er stiv og paa dens Ventralflade sees en Fure, der her danner Grændsen for de rudimentære Finner (Fig. 4). Disse ere yderst korte og fremkomme egentlig derved, at Polyperne ved deres Grunddel ere sammenvoxede. Paa de to nærmest Ventralsiden stødende Polyper iagttages denne Sammenvoxning at strække sig næsten op til en Trediedel af Polypkroppen. De rudimentære Finner støttes af en Kalkplade, bestaaende af en vifteformig Samling af Spicler, hvoraf de kortere i Regelen ikke naa op over det Sted, hvor Polyperne ere sammenvoxede, medens de længste rage med deres Spidser frit op over Finnen (Fig. 3 a). Finnerne sidde lidt afvexlende, danne kun korte Mellemrum, der baade paa Dorsal- og Ventralfladen ere nøgne. Paa begge disse Flader findes henimod Finnerne en temmelig ophøiet Vulst, der svarer til de radiære Kanaler og bidrager paa Ventralfladen til at gjøre Furen paa de Steder dybere (Fig. 4). Ved Siden af Finnerne, næsten omfattende disse, findes paa Stokken flere Rækker 5—6 Zooider (Fig. 4, 5), der snart paa Dorsalfladen samle sig i en Gruppe, just paa det Sted, hvor den ene Polyprække støder henimod den anden (Fig. 3 b, 5 b) snart lige over Finnerne noget nærmere Ventralfladen (Fig. 4). Polyperne, der ere 5—6 i Antal, have et cylindrisk, meget langstrakt Legeme, ere 3—4 Mm. lange i rolig Tilstand; men naar de udstrække sig, opnaa de en Længde af 6—7 Mm. (Fig. 4 og 5). Tentaklerne ere 2 Mm. lange, temmelig tykke, forsynede med mange tykke Traade (Pinnulæ) og en Række stærke Spicler, der gaa lige ud til Spidsen (Fig. 6—7). Ingen Celle findes, dette sees bedst paa de to i Gruppen yderst stillede Polyper; thi hos dem er hele den

DÜBENIA ELEGANS, Nob.

(Tab. 3, fig. 1—7).

Synon. *Virgularia elegans,* D. Videnskabsselskabets Forhandlinger i Christiania 1859, p. 251.
— *Stylatula elegans,* Richiardi, l. c. p. 73.
— *Styl. elegans,* Kölliker, l. c. p. 225, fig. 137—138.

In the scientific society in Christiania, one of us in 1859 announced a new species, Virgularia elegans, which we even at that time presumed would form a new genus. A long time has elapsed since the announcement took place; and the American naturalist Verrill has presented similar forms from California under the generic name Stylatula, to which Richiardi has referred this our seapen; but as it differs in several essential characteristics from the Stylatula, and at the same time entirely coincides with the genus Dübenia established by us, it must be referred to the latter.

Unfortunately all the specimens we have found are only larger or smaller fragments, for which reason we cannot communicate a very complete description. We can however elucidate the most essential points.

The largest piece of the polypiferous trunk which we found is 275 Mm. long, and had still on its lower part rather large polyps (see tab. 3, fig. 1). On the upper part, the axis projected about 8 Mm. beyond the sarcosoma.

The polypary is stiff; and on its ventral side there appears a furrow which here forms the boundary for the rudimentary fins (fig. 4). The fins are extremely short, and are produced by the polyps being connate at their basal part. In the two polyps in contact nearest to the ventral side, this connexion appears to extend to nearly one third part of the body of the polyp. The rudimentary fins are supported by a calcareous plate composed of a fan-like collection of spicula, of which the shorter ones do not usually extend beyond that part where the polyps are connate; while the longest project with their points free beyond the fin (fig. 3 a). The fins are situated somewhat alternately, forming only short intervals which both on the dorsal and ventral surfaces are bare. On both these surfaces there exists, towards the fins, a distinct protuberance, which corresponds to the radial canals, and contributes on the ventral surface to make the furrow at those places deeper (fig. 4). At the side of the fins and nearly surrounding them, there are on the trunk several (5—6) rows of zooids (fig. 4, 5) which are sometimes collected in a group on the dorsal surface just at the spot where one row of polyps meets the other (fig. 3 b, 5 b) and sometimes just over the fins a little nearer to the ventral surface (fig. 4). The polyps, 5—6 in number, have a cylindrical very elongated body, are 3—4 Mm. long when quiescent, but when they extend themselves, they attain a length of 6—7 Mm. (fig. 4 and 5). The tentacles are 2 Mm. long, rather thick, furnished with numerous thick filaments (pinnulæ) and a row of strong spicula extending right up to the point (fig. 6—7). There are no cells. This is best seen in the two exterior

udvendige Side fri, ikke sammenvoxet ved Basaldelen, men gaar umiddelbart over i Sarcosomaet. Polyperne kunne imidlertid trække sig noget sammen; men da de ingen Celle have og heller ikke kunne trække sig ind i Sarcosomaet, er det kun en Sammentrækning i sig selv. Denne sker langsomt og paa den Maade, at den lange Krop forkortes successivt, og Tentaklerne indkrænges derefter, hvorfor en saadan sammentrukken Polyp kan have de forskjelligste Former. Paa Grund af den Træghed, hvormed Polyperne trække sig sammen, sees de allerfleste bestandig at være ude, endog paa Spiritus-Exemplarer. Æggene udvikles i hele Kropshulheden, saavel i de peri- som hypogastriske Rum, og kunne ganske udfylde disse. Axen stiv, rund, lige, 1 Mm. tyk, og oventil tvers afskaaren. Stokken tilligemed Polyperne have i levende Live en brunrød eller brunviolet Farve.

Vi fandt den ved Molde paa en Dybde fra 30—60 Favne i lerholdig Sand.

G. O. Sars har fundet et Stykke af et Exemplar ved Bodø paa 60—80 Favne.

Dübenia elegans kan characteriseres saaledes:

Rachis robust, rigt besat med Polyper. Finnerne rudimentære, meget korte, bære 5—6 lange Polyper. Ved Siden af Finnerne, næsten omfattende deres Basis, 5—6 Rader stærkt udviklede Zooider, der som oftest paa Dorsalfladen samle sig i en trekantet Gruppe. Ventralfladen forsynet med en dyb Fure. Farven brunrød eller brunviolet.

FORKLARING OVER FIGURERNE.

Tab. 10, Fig. 1. Dübenia abyssicola, naturlig Størrelse.

Fig. 2. Den samme, seet fra Bugsiden, lidt forstørret. *a* Zooider.

Fig. 3. Den samme, seet fra Rygsiden, mere forstørret. *a* Kalkpladen og den rudimentære Finne; *b* Polyper mere og mindre sammentrukne; *c* Zooider; *d* en Polyp, hvor Tentaklerne ere indtrukne og Kroppen noget foldet, antaget Ægformen.

Fig. 4. En Gruppe Polyper bestaaende af 3, for at vise Sammenvoxningen af Basaldelen mellem den midterste Polyp og Sidepolypernes indvendige Flader, hvorved den rudimentære Finne dannes, samt Kalkpladen med dens korte og lange Spicler, stærkt forstørret. *a* Spicler i Polypens Krop; *b* Kalkpladen.

Fig. 5. En Tentakel med Spicler, stærkt forstørret.

Fig. 6. Kalkspicler i Polypens Krop, stærkt forstørret.

Fig. 7. Dübenia abyssicola varietas smaragdina, naturlig Størrelse. *a* 2 sammenloddede Polyper.

Fig. 8. Den samme, seet fra Bugsiden.

I nedenstaaende Figurer have samme Bogstaver samme Betydning:

Fig. 9. Gjennemsnit af Stokken mellem to Grupper Polyper. *v* Ventralkanal; *d* Dorsalkanal; *s* Sidekanal; *b* Længdekanaler i Sarcosomaet; *l'* mindre Ernæringskanaler i Axens Skede, som ogsaa væsentligst gaa efter Længden af Stokken. Lignende Kanaler findes ogsaa i Sarcosomaet overalt, hvor dette fortykkes.

Fig. 10. Gjennemsnit af Stokken lige under Polypernes Udgangspunkt. *r v* ventrale Radiærkanaler; *rd* dorsale Radiærkanaler; *f* den rudimentære Finne med talrige capillære Ernæringskanaler.

polyps of the group; for in these the whole exterior side is free, not connate with the basal part, but merging immediately in the sarcosoma. The polyps can however contract themselves; but as they have no cells, and cannot retire into the sarcosoma, it is merely a simple contraction. This takes place slowly; the long body becoming successively shorter, and the tentacles invaginated; by which means a polyp thus contracted may assume the most various forms. On account of the sluggishness with which the polyps shrink in, by far the greater number of them appear to be always out, even in spirit specimens. The ova are developed in the whole cavity of the body, as well in the perigastric as in the hypogastric spaces, which they may entirely occupy. The axis is rigid, round, straight 1 Mm. thick, and above transversely truncated. The polypary, together with the polyps, has in the living state a brownish red or brownish violet color.

We found it at Molde at the depth of 30—60 fathoms in clayey sand.

G. O. Sars has found a piece of a specimen at Bodö in 60—80 fathoms.

Dübenia elegans may be thus characterised:

The rachis stout, richly covered with polyps. The fins rudimentary, very short, bearing 5—6 long polyps. By the side of the fins, and nearly surrounding their base 5—6 rows of strongly developed zooids, which are most frequently collected on the dorsal surface in a three-cornerned group. The ventral surface has a deep furrow. The color brownish red or brownish violet.

EXPLANATION OF THE FIGURES.

Tab. 10, fig. 1. Dübenia abyssicola, natural size.

Fig. 2. The same viewed from the ventral side, slightly magnified. *a* zooids.

Fig. 3. The same viewed from the dorsal side more magnified. *a* the calcareous plate and the rudimentary fin; *b* polyps more or less contracted; *c* zooids; *d* a polyp, in which the tentacles are retracted and the body somewhat folded, having assumed an oval form.

Fig. 4. A group of polyps consisting of 3, shewing the connexion of the basal part between the middle polyp and the lateral polyps' interior surfaces, whereby the rudimentary fin is formed; also the calcareous plate with its short and long spicula strongly magnified. *a* spicula in the body of the polyp; *b* the calcareous plate.

Fig. 5. A tentacle with spicula strongly magnified.

Fig. 6. Calcareous spicula in the body of the polyp, strongly magnified.

Fig. 7. Dübenia abyssicola varietas smaragdina, natural size. *a* 2 connate polyps.

Fig. 8. The same viewed from the ventral side.

In the figures below, the same letters have the same signification.

Fig. 9. Section of the polypary between two groups of polyps. *v* the ventral canal; *d* the dorsal canal; *s* the lateral canal; *b* the longitudinal canals in the sarcosoma; *l'* smaller alimentary canals, in the sheath of the axis, which also go chiefly in the longitudinal direction of the polypary. Similar canals exist also in the sarcosoma in all those places where it is thickened.

Fig. 10. Section of the polypary inmediately below the point whence the polyps proceed. *r v* ventral radial canals; *r d* dorsal radial canals; *f* the rudimentary fin with numerous capillary alimentary canals.

Fig. 11. Gjennemsnit af Stokken ved Basis af Polyperne, hvorpaa ikke alene de radiære Kanaler, der tage deres Udspring fra Dorsal- og Ventralkanalerne, sees, men paa hvilket ogsaa Sammenvoxningen mellem to Polyper vises tydeligt.
Fig. 12. Et Stykke af Axen *a* med afløst Cuticula *c*; *rf* Gjennemsnit af Axens radiære Fibre; *p* aabne capillære Saftkanaler.
Fig 13. Epithel fra en mindre Længdekanal og en mindre Ernæringskanal, hvilket fuldstændigt udfylder Kanalens Lumen.

Tab. 3, Fig. 1. Det største Stykke, vi fandt af Dübenia elegans, naturlig Størrelse, seet fra Dorsalfladen.
Fig. 2. En udstrakt Ende-Polyp med lidt af Sarcosomaet, forstørret.
Fig. 3. Et Dorsalparti, forstørret. *a* Spicler, der støtte den rudimentære Finne; *b* Grupper af Zooider.
Fig. 4. Et Ventralparti, forstørret, der viser Furen og Zooiderne.
Fig. 5. Et Sideparti, forstørret. *a* Kalkpladens Spicler; *b* Zooider.

Fig. 6. En Tentakel med Spicler, forstørret.
Fig. 7. De enkelte Tentakelspicler, forstørret.

LYGOMORPHA, Nob.[1])

SLÆGTSCHARACTER.

Smaa Søfjære med robust Stilk. Stilkens Ende kølleformig. Ventralfladen rund, bred og nøgen. Cellerne tykke, siddende afvexlende paa Ryg og Sider, have en halvmaaneformig Aabning, forsynet med to stærke Tænder. Polyperne retractile. Zooiderne faa, adspredte paa Dorsalfladen. Kalkspicler i Cellerne, Tentaklerne og Sarcosomaet. Axen rund.

LYGOMORPHA SARSII, Nob.[2])

(Tab. 9, Fig. 7—12).

Denne lille Søfjær, der henhører til Familien Virgularieæ, har en robust Stok, som er cylindrisk, lidt tykkere mod den øverste Del, medens den nederste polypløse Del ender kølleformigt. Rachis er lige til Spidsen besat med Polyper (Fig. 7, 8). Disse sidde uregelmæssigt afvexlende paa Ryg og Sider, snart enkeltvis, snart 2 og 2, snart i Grupper paa 3—4 Polyper, hvorimod Ventralfladen er rund, bred og ganske blottet. Zooiderne ere faa, sidde adspredte paa Dorsalfladen. Cellerne ere tykke, omtr. 2 Mm. høie, lidt brede ved Basis, og forsynede med to stærke Tænder (Spidser Fig. 9 a). Cellens Aabning vid og halvmaaneformig. Indsnittet er omtrent dobbelt saa dybt paa den Side, der vender mod Stokken (Fig. 9 b) som paa den anden, saa at Cellens ydre Væg (Fig. 9 c) bliver høiere end den indre. Cellens Væg tæt besat med en Mængde Spicler, der samle sig pyramideformigt op imod de tvende Spidser, som de hjælpe til at danne (Fig. 9 d). Polyperne temmelig store, kunne indtrækkes i Cellerne, deres Tentakler ere forsynede med mange

[1]) *λύγος*, tynd Gren, *μορφή*, Form.
[2]) Vi have opkaldt denne Art efter den unge meget dygtige Naturforsker G. O. Sars, der velvilligen har offret os til Undersøgelse de to Exemplarer, han har fundet.

Fig. 11. Section of the polypary at the base of the polyps, shewing the radial canals issuing from the dorsal and ventral canals, and also the connexion between two polyps.
Fig. 12. A part of the axis *a* with separated cuticle *c*; *rf* section of the radial fibres of the axis; *p* open capillary sap-canals.
Fig. 13. Epithelium, from a smaller longitudinal canal and a smaller alimentary canal, which completely fills up the interior space of the canal.
Tab. 3, fig. 1. The largest piece which we found of Dübenia elegans of natural size, viewed from the dorsal side.
Fig. 2. An extended terminal polyp with a little of the sarcosoma magnified.
Fig. 3. A dorsal part magnified. *a* spicula supporting the rudimentary fin; *b* groups of zooids.
Fig. 4. A ventral part magnified shewing the furrow and the zooids.
Fig. 5. A lateral part magnified. *a* spicula of the calcareous plate; *b* zooids.
Fig. 6. A tentacle with spicula, magnified.
Fig. 7. The separate spicula of the tentacle, magnified.

LYGOMORPHA, Nob.[1])

GENERIE CHARACTERS.

Small sea-pens with stout polypary. The end of the stalk club-shaped; the ventral surface round broad and naked. The cells thick, sessile, alternating on the back and sides, have a semilunar aperture furnished with two strong teeth. The polyps are retractile. The zooids few, scattered on the dorsal surface. Calcareous spicula in the cells the tentacles and the sarcosoma. The axis round.

LYGOMORPHA SARSII, Nob.[2])

(Tab 9, fig. 7—12).

This little sea-pen, which belongs to the family Virgularieæ, has a stout polypary, cylindrical, a little thicker towards the upper part; while the lower part, destitute of polyps, terminates like a club. The rachis is covered with polyps to the very point (fig. 7, 8). These polyps are situated irregularly, alternating on the back and sides; sometimes separately, sometimes 2 and 2, sometimes in groups of 3—4 polyps; while on the other hand the ventral surface is round, broad and quite bare. The zooids are few and they are dispersed over the dorsal surface. The cells are thick, about 2 Mm. high, a little broader at the base, and furnished with two strong teeth (points) (fig. 9 a). The aperture of the cells wide, and semilunar. The incision is about twice as deep on the side which turns towards the polypary (fig. 9 b) as on the other side; so that the exterior wall of the cell (fig. 9 c) is higher than the interior. The wall of the cell thickly covered with numerous spicula which are accumulated pyramidally towards the two points and help

[1]) *λύγος*, thin branch, *μορφή*, form.
[2]) We have called this species after the young and very able naturalist G. O. Sars who has kindly offered us for examination the two specimens which he has found.

Traade og paa deres aborale Flade er en Række Spicler. Ogsaa i Stokkens Sarcosoma findes en Mængde Spicler.

Axen, der skinner tydeligt gjennem Sarcosomaet, er 1 Mm. tyk og gaar lige ned i Bunden af den kølleformige Stilk, hvor den ender tilspidset og yderst svagt bøiet.

Langs Axen ere fire Længdekanaler, der gaa lige ned til den nederste Ende. Farven saavel paa Stokken som Polyperne er bleggul.

Den er funden i 2 Exemplarer af Professor G. O. Sars ved Risvær i Lofoten paa 80—100 Favnes Dyb, sandig Bund.

Lygomorpha Sarsii characteriseres saaledes:

Rachis cylindrisk, lidt tykkere mod den øverste Del. Rachis lige til Spidsen besat med Polyper, der sidde uregelmæssigt afvexlende paa Ryg og Sider, dels enkeltvis, dels 2 og 2, og dels i Grupper paa 3 og 4. Cellens halvmaaneformige Indsnit er omtrent dobbelt saa dybt paa den Side, der vender mod Stokken, som paa den anden. Farven paa Stok og Polyper bleggul.

Udmaalinger af 2 Exemplarer i Mm.:

	A.	B.
Stokkens hele Længde . . .	120	105
Rachis do. . . .	85	70
Stilkens do. . . .	35	35
Polypernes Antal	86	62

Slægten Lygomorpha kommer nærmest Halipteris, Kølliker, men adskiller sig dog væsentlig fra denne derved, at Polypstokken er meget kort, kølleformig med faa Polyper. Cellerne tykke, forsynede med to lange, stærke Tænder (Spidser) og en halvmaaneformig Aabning med Indsnittet dybest mod Stokken. Zooider sparsomme og paa Dorsalfladen. Ventralfladen rund, bred og nøgen.

FORKLARING OVER FIGURERNE.

Tab. 9, Fig. 7. Et Exemplar i naturlig Størrelse, seet fra Ryggen.
Fig. 8. Det samme, fra Ventralsiden.
Fig. 9. En Celle, forstørret, med sin halvmaaneformige Aabning. *a* Tænderne; *b* indre, dybere Indsnit; *c* ydre Væg; *d* Spicler.
Fig. 10. Cellens Spicler, forstørret.
Fig. 11. En Tentakel med Spicler, forstørret.
Fig. 12. Tentakelspicler, stærkere forstørret.

CLADISCUS, Nob. [1])

Danielssen har i sin Beretning om en zoologisk Reise, foretagen i Sommeren 1857, opført Virgularia mirabilis, som af ham funden ved Slotholmen i Lofoten. Ved nu nærmere at undersøge hans Exemplar, der destoværre mangler den egentlige Stilk, viser det sig, at denne Søfjær fjerner sig saa langt fra Virg. mirabilis, at den endog maa danne en ny Slægt, der af os er givet ovenanførte Navn.

[1]) *Κλαδίσκος*, en liden Gren.

to form them (fig. 9 d). Thy polyps are rather large and can be retracted into the cells; their tentacles, furnished with many filaments, have on their aboral surface a row of spicula. Also in the sarcosoma there are numerous spicula.

The axis which shines plainly through the sarcosoma is 1 Mm. thick, and goes right to the bottom of the claviform stalk, where it terminates in a point very slightly curved.

Along the axis there are four longitudinal canals which go right down to the lower extremity. The color, as well of the polypary as of the polyps, is pale yellow.

Two specimens have been found by Mr. G. O. Sars at Risvær in Lofoten at the depth of 80—100 fathoms, on sandy bottom.

Lygomorpha Sarsii is thus characterised:

The rachis cylindrical, a little thicker towards the upper parts. The rachis, up to the very point, covered with polyps irregularly alternating on the back and sides, singly or 2 and 2 and partly in groups of 3 or 4. The semilunar incision of the cell is about twice as deep on the side that turns towards the polypary as on the other. The color of the polypary and of the polyps pale yellow.

Measurements of two specimens in millimetres.

	A.	B.
Total length	120	105
Rachis	85	70
Stalk	35	35
Number of polyps	86	62

The genus Lygomorpha comes nearest to the Halipteris, Kölliker, but is yet essentially distinguished from it by the polypary being very short, claviform and with few polyps. The cells are thick, furnished with two strong teeth (points) and a semilunar aperture with the incision deepest towards the polypary. The zooids rare and on the dorsal surface. The ventral surface round, broad and bare.

EXPLANATION OF THE FIGURES.

Tab. 9, fig. 7. A specimen of natural size viewed from the back.
Fig. 8. The same viewed from the ventral side.
Fig. 9. A cell magnified with a semilunar aperture. *a* the teeth; *b* interior deeper incision; *c* exterior wall; *d* spicula.
Fig. 10. Spicula of the cell, magnified.
Fig. 11. A tentacle with spicula, magnified.
Fig. 12. Single spicula, more magnified.

CLADISCUS, Nob. [1])

Danielssen has in his report of a zoological journey made in the summer of 1857 noticed the Virgularia mirabilis as found by him at Slotholmen in Lofoten. On closer examination of his specimen, in which unfortunately the proper stalk is wanting, this sea-pen appears to differ so much from Virg. mirabilis that it must even form a new genus, which we have named as above.

[1]) *Κλαδίσκος*, a small branch.

SLÆGTSCHARACTER.

Stokken liden, stiv. Cellerne adskilte, siddende paa Rachis i afvexlende Rækker, forsynede med 8 Længderibber, samt 8 Papiller omkring Aabningen. Polyperne robuste, retractile. Zooiderne ventrale. Ingen Kalk hverken i Polyper, Celler eller Sarcosomaet.

CLADISCUS GRACILIS, Nob.
(Tab. 9, Fig. 13—15).

Stokken liden, tynd og stiv, næsten rund, maaske lidt fladtrykt paa Ventralfladen, og i Spidsen blottet for Sarcosoma i en Strækning af 1 Mm. Cellerne sidde i spredte, afvexlende Rækker 3 og 3 paa hver Side af Stokken, og strække sig over til Dorsalfladen, hvor de paa den midterste Del af Rachis dække ganske denne, der forøvrigt er nøgen. Cellerne ere krukkeformige, 2 Mm. lange, adskilte lige til Sarcosomaet, hvor de ere smalest; de have 8 Længderibber, imellem hver en hvid glindsende Stribe; Aabningen rund, vid, forsynet med 8 temmelig store, bløde Papiller. Afstanden mellem Celleraderne er 5 Mm. Paa hver Side af Rachis 21 Cellerader, saa der paa den hele Stok var 126 Celler.

Polyperne ere retractile, cylindriske, temmelig lange, forsynede med tykke i Spidsen afstumpede Tentakler, der paa hver Side have 10—12 tykke Traade. Hverken i Polyperne eller Cellerne findes Spor af Kalk. Sarcosomaet er ligeledes kalkfrit, meget gjennemskinnende, tyndt især paa Dorsalfladen, saa at Axen sees meget tydeligt. Paa Ventralfladen, der er lidt flad og forsynet med en svag Midtfure, der er nøgen, sees paa hver Side en Række spredte Zooider, der paa det Sted, som findes mellem hver Gruppe Celler, trænge sig mere sammen, blive større og danne stærke Ventralvulster, der have et ganske eiendommeligt, ligesom crenuleret Udseende, idet nemlig Zooiderne, som ere meget langstrakte, ligge næsten vifteformigt ordnede i Vulsten (Fig. 15 a). I hver Vulst er fra 20—25 Zooider.

Farven: Gulhvid, omtrent som Virg. mirabilis.

Findested: Slotholmen (Lofoten) paa dyndet Lerbund, 40 Favne.

Cladiscus gracilis kan characteriseres saaledes:

Stokken liden, tynd og stiv. Rachis 70 Mm. Cellerne krukkeformige, siddende 3 i hver Række afvexlende paa Stokken. Farven bleggul.

FORKLARING OVER FIGURERNE.

Tab. 9, Fig. 13. Cladiscus gracilis, naturlig Størrelse, seet fra Ryggen.
Fig. 14. Et Stykke af samme, lidt forstørret.
Fig. 15. Et Stykke stærkt forstørret, fra Bugsiden. *a, a* Zooider; *b, b* de krukkeformige Celler, forsynede med sine Længderibber og sine 8 Papiller; *c, c* Polyper.

GENERIC CHARACTERS.

The polypary small and rigid. The cells situated separately on the rachis in alternating rows with 8 longitudinal ribs, and 8 papillæ round the aperture. The polyps stout and retractile. The zooids ventral. No calcareous matter in the polyps, cells or sarcosoma.

CLADISCUS GRACILIS, Nob.
(Tab. 9, fig. 13—15).

The polypary small, thin and rigid, nearly round, perhaps a little flattened on the ventral surface, and at the point denuded of sarcosoma to an extent of 1 Mm. The cells are situated in dispersed alternating rows 3 and 3 on each side of the polypary, and extend to the dorsal surface, which in the middle part of the rachis they entirely cover, and which otherwise is bare. The cells are urn-shaped, 2 Mm. long, separated even to the sarcosoma, where they are narrowest; they have 8 longitudinal ribs, and between each two a white shining stripe. The aperture is round and wide, furnished with 8 rather large soft papillæ. The distance between the rows of cells is 5 Mm. On each side of the rachis 21 rows of cells, so that on the whole polypary there were 126 cells.

The polyps are retractile, cylindrical, rather long, having thick tentacles truncated obtusely at the extremity, with 10—12 thick filaments. Neither in the polyps nor in the cells, is there any trace of calcareous matter; and the sarcosoma is likewise free from the same, very transparent and thin, especially on the dorsal surface, so that the axis is very plainly seen. On the ventral surface, which is a little flat and has a slight medial furrow which is bare, there appears a series of scattered zooids, which in the spaces between the groups of cells are more agglomerated, become larger, and form strong ventral protuberances of a very peculiar, as it were, crenulated appearance; the zooids, which are very much elongated, lying in the protuberances nearly in fan-like arrangement (fig. 15 a). In each protuberance there are from 20 to 25 zooids.

The color is yellowish white, about like that of Virg. mirabilis.

It is found at Slotholmen (Lofoten) on miry clay bottom at the depth of 40 fathoms.

Cladiscus gracilis may be thus characterised:

The polypary small, thin and rigid. The rachis 70 Mm. The cells urn-formed, situated 3 in each row, alternating on the trunk. Color pale yellow.

EXPLANATION OF THE FIGURES.

Tab. 9, fig. 13. Cladiscus gracilis, natural size, seen from the dorsal side.
Fig. 14. A part of the same, slightly magnified.
Fig. 15. A part strongly magnified, seen from the ventral side. *a, a* zooids; *b, b* the jar-formed cells with their longitudinal ribs and their 8 papillæ; *c, c* polyps.

Vi skulle nu til Slutning levere en Fortegnelse over de Pennatulider, som forekomme ved de skandinaviske Kyster, samt deres Udbredning.

PENNATULEÆ.

FAMILIE *PENNIFORMES.*

UNDERFAMILIE PENNATULINÆ.

1. Slægt *Pennatula,* Lin.:
   a. *Penn. phosphorea,* Lin. Bergensfjord, Søndfjord, Christianiafjord, 40—50 Favne.
   α. — *phosph. var. variegata,* Köll. Foruden de nævnte Steder ogsaa Kattegattet, samme Dybde.
   β. — *phosph. var. angustifolia,* Köll. Christianiafjorden efter Kölliker; vi have ikke fundet den.
   b. — *aculeata,* K. & D. Ved Lofoten (G. O. Sars), Christiansund og Østeraat, Throndhjemsfjorden, 80—100 Favne. Sars angiver 30—70.
   α. — *aculeata var. rosea,* K. & D. Askevold, Søndfjord, 30—50 Favne.
   c. — *distorta,* K. & D. Askevold i Søndfjord 40—50 Favne.
2. Slægt *Ptilella,* Gray:
   Ptilella grandis, Ehrenb. Ranenfjord, Helgeland, Lofoten (Nordland), Christiansund, Herø, Søndmør, Bergensfjorden, Hardanger- og Stavangerfjord, 150—200 Favne.

FAMILIE *VIRGULARIEÆ.*

1. UNDERFAMILIE VIRGULARINÆ.

1. Slægt *Virgularia,* Lamarck:
   a. *Virg. affinis,* K. & D. Varangerfjord, Finmarken, 60—100 Favne.
   b. — *mirabilis,* Müll. Nordland, Lofoten (G. O. Sars), Molde, Bergensfjord, Christianiafjord, 50—80 Favne.
2. Slægt *Dübenia,* K. & D.:
   a. *D. abyssicola,* K. & D. Lofoten (G. O. Sars), Ramsfjord, nogle Mile nord for Bergen, 100—120 Favne.
   α. D. abyssicola var. smaragdina, K. & D. Samme Localitet og Dybde.
   b. *D. elegans,* K. & D. Bodø (G. O. Sars), Molde-Fjord, 30—60.
3. Slægt *Scytalium,* Herklots:
   Scyt. Sarsii, Herkl. Denne Søfjær angives af Herklots at tilhøre Nordsøen (Mer du nord), men saavidt os bekjendt er den ikke funden af nogen skandinavisk Naturforsker.
4. Slægt *Pavonaria,* Kölliker:
   P. finmarchica, Sars. Øxfjord i Finmarken og Bergensfjord, 240—300.

2. UNDERFAMILIE FUNICULINEÆ.

1. Slægt *Halipteris,* Kölliker:
   H. Christii, K. & D. Lofoten, 200.
2. Slægt *Lygomorpha,* K. & D.:
   L. Sarsii, K. & D. Lofoten, 80—100.
3. Slægt *Funiculina,* Lam.:
   F. quadrangularis, Blainv. Bergensfjord og Bohuslehn, 200 Favne.
4. Slægt *Cladiscus,* K. & D.:
   Cl. gracilis, K. & D. Lofoten, 40 Favne.

FAMILIE *KOPHOBELEMNONIEÆ.*

Slægt *Kophobelemnon,* Asbjørnsen:
a. *Koph. stelliferum,* Müll. Christianiafjord, Korsfjord ved Bergen, Hardangerfjord, Bohuslehn, 40—300 Favne.

We will in conclusion give a catalogue of the Pennatulidæ which are found on the Scandinavian coasts, indicating their distribution.

PENNATULEÆ.

FAMILY *PENNIFORMES.*

SUB FAMILY PENNATULINÆ.

1. Genus *Pennatula,* Lin.:
   a. *Penn. phosporea,* Lin. Bergensfjord, Söndfjord, Christianiafjord, 40—50 fathoms.
   α. — *phosph. var. variegata,* Köll. Besides the above places also the Cattegat, same depth.
   β. — *phosph. var. angustifolia,* Köll. Christianiafjord according to Kölliker. We have not found it.
   b. — *aculeata,* K. & D. At Lofoten (G. O. Sars), Christiansund and Österaat, Throndhjemsfjord, 80 - 100 fathoms. Sars states 30—70.
   α. — *aculeata var. rosea,* K. & D. Askevold, Söndfjord, 30—50 fathoms.
   c. — *distorta,* K. & D. Askevold, Söndfjord, 40—50 fathoms.
2. Genus *Ptilella,* Gray:
   Ptilella grandis, Ehrenb. Ranenfjord, Helgeland, Lofoten (Nordland), Christiansund, Herø, Søndmør, Bergensfjord, Hardanger- and Stavangerfjord, 150—200 fathoms.

FAMILY *VIRGULARIEÆ.*

1. SUB FAMILY VIRGULARINÆ.

1. Genus *Virgularia,* Lam.:
   a. *Virg. affinis,* K. & D. Varangerfjord, Finmarken, 60—100 fathoms.
   b. — *mirabilis,* Müll. Nordland, Lofoten (G. O. Sars), Molde, Bergensfjord, Christianiafjord, 50—80 fathoms.
2. Genus *Dübenia,* K. & D.:
   a. *D. abyssicola,* K. & D. Lofoten (G. O. Sars), Ramsfjord, some miles North of Bergen, 100—120 fathoms.
   α. D. abyssicola var. smaragdina, K. & D. Same locality and depth.
   b. *D. elegans,* K. & D. Bodö (G. O. Sars), Moldefjord 30—60.
3. Genus *Scytalium,* Herklots:
   Scyt. Sarsii, Herkl. This sea-pen is said by Herklots to belong to the North sea (Mer du Nord), but so far as we know, it has not been found by any Scandinavian Naturalist.
4. Genus *Pavonaria,* Kölliker:
   P. finmarchica, Sars. Øxfjord in Finmark and the Bergensfjord, 240—300.

2 SUB FAMILY EUNICULINEÆ.

1. Genus *Halipteris,* Kölliker:
   Hal. Christii, K. & D. Lofoten, 200.
2. Genus *Lygomorpha,* K. & D.:
   L. Sarsii, K. & D. Lofoten 80—100.
3. Genus *Funiculina,* Lin.:
   F. quadrangularis, Blainv. Bergensfjord and Bohuslehn, 200 fathoms.
4. Genus *Cladiscus,* K. & D.:
   Cl. gracilis, K. & D. Lofoten, 40 fathoms.

FAMILY *KOPHOBELEMNONIEÆ.*

Genus *Kophobelemnon,* Asbjörnsen:
a. *Koph. stelliferum,* Müll. Christianiafjord, Korsfjord near Bergen, Hardangerfjord, Bohuslehn, 40—300 fathoms.

b. *Koph. Leuckartii,* Köll. Bergensfjord, Jæderen (Möbius), 220—300 Favne.

I 2det Hefte af Fauna littor. Norvegiæ leverede Sars og vi et Bidrag til de nordiske Pennatulider, hvori vi blandt andet gjorde opmærksom paa, at dengang tilhørte 7 Arter den norske Fauna, hvoraf de 5 forekom ved Bergens Kyster. Siden den Tid har Antallet forøget sig med det dobbelte, idet vi nu have opstillet 15 distincte Arter foruden den af Herklots opstillede nye Slægt Scytalium og desforuden 4 udprægede Varieteter. Ved de britiske Kyster findes derimod kun 5 distincte Arter og 2 af Köllikers Subvarieteter af P. phosphorea. Efter at Kölliker har reduceret flere af Richiardis Arter, saaledes nemlig ganske inddraget hans 2 Cavernularier og henført dem til Stylobelemnon pusillum, og opløst Pteroides Vogtii, Grayi, Cornaliæ og Clausii i de to Varieteter brevispinosa og longispinosa, beholder altsaa Middel- og Adriaterhavet blot 9 distincte Arter og 2 Varieteter.

b. *Koph. Leuckartii,* Köll. Bergensfjord, Jæderen (Möbius), 220—300 fathoms.

In the 2nd volume of Fauna littor. Norvegiæ, Sars and we communicated a contribution to the northern Pennatulidæ, wherein we pointed out, inter alia, that 7 species at that time belonged to the Norwegian Fauna, of which 5 were found off the coasts of Bergen. Since that time the number has been increased to the double, as we have now established 15 distinct species, besides the new genus Scytalium established by Herklots and moreover 4 marked varieties. On the British coasts there are only 5 distinct species and 2 of Kölliker's subvarieties of P. phosphorea. Since Kölliker has reduced several of Richiardi's species, that is to say quite withdrawn his 2 Cavernulariæ and referred them to Stylobelemnon pusillum, and dissolved Pteroides Vogtii, Grayi, Cornaliæ and Clausii into the two varieties brevispinosa and longispinosa, the Mediterranean and the Adriatic have only 9 distinct species and 2 varieties.

FORKLARING OVER FIGURERNE.

(Tab. 12, Fig. 1—3 Dübenia abyssicola.)

Tab. 12, Fig. 1. Længdesnit af Stokken ved Overgangen fra de rudimentære til fuldt udviklede Polyper. Snittet er parallelt med Ventralfladen og falder noget skjævt, har nedad kun medtaget Sarcosomaet, opad ogsaa endel af Axen. *s* Sarcosoma med Længdekanaler *l; rv* ventrale Radiærkanaler; *a* Axen; c dens Cuticula; *a'* dens Skede; *z* Zooider.

Fig. 2. Gjennemsnit af den bløde Stilk. *l* Længdekanaler omgivne af langsgaaende Muskler, nogle af Kanalerne injicerede fra Ventralkanalen; *l'* capillære Ernæringskanaler i Sarcosomaet; *l''* en større capillær Ernæringskanal, som findes paa enkelte Strækninger i Midten af Septum; *ø* Septum transversale; *d* Dorsalkanal; *v* Ventralkanal.

Fig. 3. Injicerede Længdekanaler med deres Anastomoser, seet fra Siden.

EXPANATION OF THE FIGURES.

(Tab. 12, fig. 1—3 Dübenia abyssicola.)

Tab. 12, fig. 1. Longitudinal section of the polypary at the transition from the rudimentary to the fully developed polyps. The section is nearly parallel with the ventral surface and falls somewhat obliquely, including below only the sarcosoma, and above also a part of the axis. *s* the sarcosoma with longitudinal canals *l; rv* ventral radial canals; *a* the axis; *c* its cuticula; *a'* its sheath; *z* zooids.

Fig. 2. Section of the soft stalk. *l* longitudinal canals surrounded by longitudinal muscles; some of the canals injected from the ventral canal; *l'* capillary alimentary canals in the sarcosoma; *l''* a larger capillary alimentary canal existing in some places in the middle of the septum; *ø* septum transversale; *d* the dorsal canal; *v* the ventral canal.

Fig. 3. Injected longitudinal canals with their anastomoses viewed from the side.

BESKRIVELSE
OVER
NYE BRYOZOER.
AF
J. Koren & D. C. Danielssen.

I Videnskabsselskabet i Christiania har Danielssen i Mødet den 15de Marts 1867 meddelt en foreløbig Beskrivelse over to Bryozoer, fundne af ham i Nordland og Finmarken, hvilke begge ere opførte som henhørende til en ny Slægt, benævnt „Kinetoskias“ [1]). Vi skulle nu levere en udførligere Beskrivelse af disse to Arter.

KINETOSKIAS SMITTII, Dan. [2])
(Tab. 3, Fig. 12—14. Tab. 12, Fig. 4—8).

Synon: *NARESIA CYATHUS?* W. Thomson. [3])

Polyzoariet straaler skjærmformigt ud med 4 stærke Hovedgrene fra en indtil 150 Mm. lang Stilk, der er trind, nøgen, fuldkommen vandklar, og fra hvis nederste, noget tykkere Del udgaa en Mængde fine Rodtrevler, som fæste den dels til smaa Stene, dels til Sand (se Tab. 3, Fig. 12). Grenene ere flere Gange dichotomisk delte, biseriale.

Zooecierne, hvis Længde er 0,80 Mm., Bredde foroven 0,31 Mm., forneden 0,13 Mm., sidde afvexlende; de ere forlængede og tilspidsede nedad, oventil tvers afskaarne, frit udstaaende (Tab. 12, Fig. 4), stribede paatvers paa den nederste smalere Del af den bagerste Flade (Tab. 12, Fig. 4 c, c), og paa det øverste ydre Hjørne forsynede med en Torn (Tab. 3, Fig. 14 & Tab. 12, Fig. 4 d, d). Aabningen, hvorigjennem Polypen træder ud, findes i den øverste Del af Zooeciet (Tab. 3, Fig. 14, Tab. 12, Fig. 4 e). Paa dettes øverste og forreste Rand findes en fast, hornagtig Apophyse (Fremstaaenhed), der er bredere forneden og smalere, noget afrundet foroven (Tab. 12, Fig. 6, 8, a, a). Denne Apophyse tjener til Insertionspunkt for en meget stærk Muskel, der udbreder sig straaleformigt

[1]) Forhandlinger i Videnskabsselskabet i Christiania, 1867, Pag. 23.

[2]) M. Sars har i Videnskabsselskabet i Christiania i sin Fortegnelse over Dybvandsarter opført den under Navnet Bugula Smittii (Kinetoskias, Danielssen).

[3]) I "Nature" for Marts 20de 1873 har Professor W. Thomson afbildet og omtalt en Bryozo funden i Biscayerhavet paa en Dybde af 1525 Favne, og som han har givet Navnet Naresia cyathus. Efter Afbildningen at dømme (thi nogen Beskrivelse deraf kjende vi ikke), have vi Grund til at antage, at denne Bryozo staar meget nær vor Kinetoskias Smittii, om den ikke er den selvsamme.

DESCRIPTION
OF
NEW BRYOZOA.
BY
J. Koren & D. C. Danielssen.

At the meeting of the Scientific Society of Christiania on the 15th March 1867, Danielssen communicated a preliminary description of two Bryozoa found by him in Nordland and Finmark, both of which are noted as belonging to a new genus called „Kinetoskias“ [1]). We shall now present a more detailed description of these two species.

KINETOSKIAS SMITTII, Dan. [2])
(Tab. 3, fig. 12—14. Tab. 12, fig. 4—8).

Synon: *NARESIA CYATHUS?* W. Thomson. [3])

The polyzoarium radiates, umbrella-like, with 4 strong main-branches, from a stem which is up to 150 Mm. long, cylindrical, naked, completely pellucid, and from the lower, somewhat thicker part of which there issue a number of rootlets, which fix it sometimes to small stones, sometimes to sand (see Tab. 3, fig. 12). The branches are biserial and several times dichotomically divided.

The zooecia, the length of which is 0,80 Mm., breadth, above, 0,31 Mm., below, 0,13 Mm., are placed alternately; they are elongated and tapered in the lower part, while the upper part is truncated and freely projecting (Tab. 12, fig. 4), striated transversely on the lower narrower part of the posterior surface (Tab. 12, fig. 4 c, c), and on the upper exterior angle, armed with a spine (Tab. 3, fig. 14 and Tab. 12, fig. 4 d, d). The aperture, through which the polyp comes out, is found in the upper part of the zooecium (Tab. 3, fig. 14, Tab. 12, fig. 4 e). On the upper and anterior margin of the latter, there is a solid horny apophysis (process) which is broader below, and narrower and somewhat rounded above (Tab. 12, fig. 6, 8, a, a). This apophysis serves as the point of insertion

[1]) Forhandlinger i Videnskabsselskabet i Christiania, 1867, pag. 23.

[2]) M. Sars, in the Scientific Society of Christiania, has noticed it in his catalogue of Deep-Sea-species, under the name Bugula Smittii (Kinetoskias, Danielssen).

[3]) In "Nature" for March 20. 1873, Professor W. Thomson has delineated and noticed a Bryozoum found in the Bay of Biscay at a depth of 1525 fathoms, and to which he has given the name Naresia cyathus. Iudging from the drawing (for we are not acquainted with any description of it) we have reason to presume that this Bryozoum is very nearly related to our Kinetoskias Smittii, if it is not the self-same animal.

paa den forreste Flade af det overliggende Zooecium (Tab. 12, Fig. 6, 8, b, b). Det er Muskelens Tendo, som er rundagtig, der fæster sig paa den øverste, afrundede Del af Apophysen, medens de enkelte Muskelfibre befæste sig paa Zooeciets Forflade op imod dets øverste Rand. Hvor der fra et Zooecium udgaa tvende Zooecier for at danne en ny Gren, — der er det underliggende Zooecium forsynet med to saadanne Apophyser, for at hvert overliggende Zooecium kan erholde sin særskilte Muskel (Fig. 8 c, c). Aviculariet, der sidder paa den ydre Rand af Zooeciet, noget ovenfor dettes Midte, er meget langstrakt, har en lav Isse, en temmelig lang Mandibel, der er bøiet mod Spidsen (Fig. 5), og forlænger sig bagtil i en smalere, tilspidset Del, hvorpaa der findes en næsten trekantet Articulationsflade. Musculaturen er stærk. Retningen af Aviculariet er udenfra indad, nedenfra opad, saa at Næbbet rager et godt Stykke ind paa Sidezooeciet.

Ooeciet er næsten kuglerundt og fæstet til Zooeciets øverste, ydre Rand, saaledes at dets runde Aabning hvælver sig over Mundaabningen (Fig. 6 c, c). I mange Ooecier saaes fuldt udviklede Æg.

Rodtraaden udspringer fra den udvendige Rands nederste Del af Zooeciet, er rund og halv gjennemsigtig og gaar ned mod det underliggende Zooecium, hvor den som oftest danner en blød, conisk Fremstaaenhed, hvis bredere Del ligesom udfylder Rummet mellem begge Zooecierne, medens den smalere Del rager frit ud (Fig. 4 b, 8 d, d). Hvor denne Fremstaaenhed findes, gaar Rodtraaden mellem to Zooecier og danner en Udbredning i Form af en Skede, som omgiver ikke alene den før beskrevne Apophyse, men ogsaa Muskelens Tendo, hvorefter den som en fin Membran dækker Zooeciets forreste Flade (Fig. 8 e, e). Muskelen ligger følgelig mellem denne Membran og Ectocysten. Rodtraaden gaar nu nedover det underliggende, ældre Zooeciums Rand, og forener sig med dettes Rodtraad; længere ned paa Grenene blive de saaledes sammensmeltede Rodtraade bredere, og naar de komme ned imod Hovedgrenens Delning, udbrede de sig som en temmelig fast, halvgjennemsigtig Membran, der gaar mod den tilsvarende Sidegren, hvor den smelter sammen med en lignende membranøs Udbredning fra denne. Paa denne Maade holdes saavel Hovedgrenene, som de nederste (inderste) Dele af Bigrenene sammen (Fig. 6 d). Ved Siden af denne Membrandannelse fortsætte nu Rodtraadene sit Løb ned imod Grenenes nederste Ende, hvor de smelte sammen til en eneste tyk Traad, som her danner den lange Stilk (Tab. 3, Fig. 12). Paa et Exemplar have vi iagttaget, at denne Sammensmelten først dannede to Hovedtraade, der omtrent 1 Tomme længere nede forenede sig til en (Stilken).

Polypiden er temmelig lang, forsynet med 24 lange Tentakler (Tab. 3, Fig. 14). Maven og den korte Tarm

for a very strong muscle, which extends radially on the anterior surface of the superincumbent zooecium (Tab. 12, fig. 6, 8, b, b). It is the tendon of the muscle, which is roundish, that attaches itself to the upper rounded part of the apophysis; while the single muscular fibres attach themselves on the anterior surface of the zooecium and towards its upper margin. Where from one zooecium there proceed two zooecia to form a new branch, there the subjacent zooecium has two such apophyses, in order that each superincumbent zooecium may have its separate muscle (fig. 8 c, c). The aviculary, which is situated on the exterior margin of the zooecium, a little above the centre, is very much elongated; it has a low crown and a rather long mandible curved towards the point (fig. 5); it is continued backward in a narrower tapered part, on which there is a nearly triangular articulating surface. The muscular system is strong. The direction of the aviculary is inward from the exterior, and upward from below; so that the beak projects some distance over the side-zooecium.

The ooecium is nearly globular, and attached to the upper exterior margin of the zooecium; so that its round opening arches over the oral aperture (fig. 6 c, c). In many ooecia there appeared fully developed ova.

The rootlet issues from the lower part of the exterior margin of the zooecium; it is round and semi-transparent, and goes down towards the subjacent zooecium, where it most frequently forms a soft conical process, the broadest part of which about fills the space between the two zooecia, while the narrower part is free (fig. 4 b, 8 d, d). Where this conical process is found, the rootlet goes between two zooecia and forms an enlargement in the shape of a vagina, surrounding not only the before mentioned apophysis, but also the tendon of the muscle, after which it covers, like a fine membrane, the anterior surface of the zooecium (fig. 8 e, e). The muscle lies consequently between this membrane and the ectocyst. The rootlet goes now downwards over the margin of the older zooecium, and connects itself with the rootlet of the latter; further down on the branches, the rootlets thus combined become broader; and when they come down towards the division of the main branch, they extend themselves in the form of a rather solid, semi-transparent membrane, which goes towards the corresponding lateral branch, where it coalesces with a similar membranous enlargement from the latter. In this manner the main branches, as well as the lower (interior) parts of the subsidiary branches, are held together (fig. 6 d). By the side of this membranous formation, the rootlets now continue their course downwards towards the lower extremity of the branch, where they coalesce in one single thick filament, which here forms the long stem (Tab. 3, fig. 12). In one specimen, we have observed that this coalescence first formed two main filaments, which, about one inch lower down, united themselves into one (the stem).

The polypide is rather long; it has 24 long tentacles (Tab. 3, fig. 14). The stomach and the short intestine

ere begge stærkt gulfarvede. Retractoren, der fæster sig i Bunden af Zooeciet (Tab. 3, Fig. 14 d) danner under Sammentrækningen en tydelig Spiral (Fig. 4 f). Paa hver Side af Tentakelskeden findes en temmelig lang Retractionsmuskel, der gaar ned og fæster sig paa den indvendige Flade af Zooeciet, et godt Stykke ovenfor Bunden (Parieto-vaginalmuskler). Foruden disse Muskler, er der tillige et Par Parietalmuskler. Med Hensyn til Nervesystemet, saa afviger det ikke væsentlig fra Smitts Beskrivelse over samme hos Bugula, men hvad det saakaldte Colonialnervesystem betræffer, saa have vi vistnok seet de klare netformige Udbredninger, som af flere Forfattere ere antagne for et fælles Nerveapparat for hele Dyrstokken, uden at vi dog have kunnet overbevise os om, at det virkelig er Nerver. Nogen Forbindelse mellem dette Colonialnervesystem og det Nervesystem, der tilhører det enkelte Dyr, have vi ligesaalidt som Nitsche kunnet iagttage.

Æggestokken er fæstet til Endocysten paa den øverste og indvendige Del af Zooeciets Flade, og bestaar af et Agglomerat af Celler, hvori Æggene udvikles. Vi have havt Anledning til at iagttage næsten fuldt udviklede Æg, 3—4 liggende ved Siden af Æggestokken, hvori forøvrigt saaes Æg i de tidligste Stadier.

Nede i Bunden af Zooeciet findes Testikkelen, der dannes af lignende Celler, som de der findes i Æggestokken; kun vare de fyldte af Zoospermer, hvoraf mange vare frigjorte og bevægede sig temmelig livligt. Kinetoskias Smittii er altsaa i Lighed med en hel Del andre Bryozoer en fuldstændig Hermaphrodit.

Vi have ovenfor beskrevet et særegent Muskelapparat, tilhørende ethvert enkelt Individ. Dette bestaar af en meget stærk Muskel, som ved sin tykke Tendo fæster sig paa det underliggende Zooecium, medens dens øvre vifteformige Del udbreder sig paa det overliggende Zooeciums forreste Flade. Denne, der indtager Størstedelen af Mundareaen, er tyndere, blødere og bøieligere, end den bagerste Flade, og er derfor mere skikket til at rette sig efter Muskelbevægelsen, ligesom den behøver mere Beskyttelse, baade fordi den er tyndere, og fordi Aabningen, hvorigjennem Dyret udstrækker sig, staar nærmere denne Side. Naar Muskelen sammentrækker sig, bevæges Zooeciet nedad, og naar den slappes, indtager det igjen sin opreiste Stilling. Men da den Aarsag, som fremkalder Sammentrækning i en Muskel, som oftest virker samtidigt paa mange, saa er Følgen den, at en stor Del af Grenen eller endog den hele sættes i Bevægelse. Det er forresten ganske interessant at iagttage, hvorledes Grenene Stykke for Stykke bøies, alt eftersom flere og flere Muskler sættes i Bevægelse, og naar denne er fuldstændig, ere Grenene næsten sammenrullede, hvorved Polyzoariets Skjærm antager en kugleformig Figur. Noget colonialt Muskelsystem findes ikke.

Saavidt os bekjendt er det blot Slægten Mimosella,

are both strongly yellow-colored. The retractor, which is attached at the bottom of the zooecium (Tab. 3, fig. 14 d), forms when contracted a distinct spiral (fig. 4 f). On each side of the tentacular sheath, there is a rather long retractor-muscle, which goes down and attaches itself on the interior surface of the zooecium some distance above the bottom (parieto-vaginal muscles). Besides these muscles, there are also a pair of parietal muscles. With respect to the nervous system, it does not differ essentially from Smitt's description of the same in Bugula; but as regards the so-called colonial nervous system, we have certainly seen the clear reticular enlargements, which by many authors have been taken for a common nervous apparatus for the whole animal complex, without our having been able to convince ourselves that they are really nerves. We have not been able, any more than Nitsche, to discover any connexion between this colonial nervous system and the nervous system which belongs to the individual animal.

The ovary is attached to the endocyst on the upper and interior part of the surface of the zooecium, and consists of an agglomeration of cells wherein the ova are developed. We have had opportunity to observe nearly completely developed ova 3—4 lying by the side of the ovary, where moreover ova in the earliest stages were also visible.

Down at the bottom of the zooecium is found the testicle, which is formed of similar cells to those which are found in the ovary; only they were filled with spermatozoa, many of which were free, and moved about in a rather lively manner. The Kinetoskias Smittii is therefore, like a great number of other Bryozoa, a complete hermaphrodite.

We have above described a peculiar muscular apparatus belonging to each single individual. This consists of a very strong muscle attached by its thick tendon to the subjacent zooecium, while its upper fan-like part extends itself over the anterior surface of the superincumbent zooecium. The latter, which occupies the greater part of the oral area, is thinner, softer and more flexible than the posterior surface, and therefore better adapted to conform itself to the muscular movement, as also it requires more protection, both because it is thinner, and because the aperture, through which the animal protrudes itself, is nearer to this side. When the muscle contracts itself, the zooecium is moved downwards, and when it is relaxed, the zooecium resumes its erect position. But as the cause which produces contraction in a muscle, most frequently acts simultaneously on many, the consequence is, that a great part of the branch, or even the whole of it, is put in motion. It is moreover very interesting to observe, how the branch bends bit by bit, accordingly as more and more muscles are set in motion; and when this is complete, all the branches are nearly rolled together, whereby the umbrella of the polyzoarium assumes a globular form. There is no colonial muscular system.

So far as we know, it is only the genus Mimosella,

hos hvem man har iagttaget en Bevægelse, der kan have nogen Lighed med den af os nu paaviste; men den adskiller sig dog væsentlig derfra, ligesom det heller ikke er os bekjendt, at der hos denne Slægt er iagttaget noget særskilt Muskelapparat for Bevægelsen.

Det første Exemplar blev fundet af den ene af os (Danielssen) ved Slotholmen i Nordland paa 80 Favnes Dyb, lerholdig Sandbund. En Del Aar senere fandt vi samtidigt 3 Exemplarer i Korsfjorden ved Bergen ogsaa paa lerblandet Sandbund, men paa en Dybde fra 150—200 Favne.

KINETOSKIAS ARBORESCENS, DAN.

(Tab. 12, Fig. 9—14).

Forhandlinger i Videnskabsselskabet i Christiania, Aar 1867, Pag. 23.

Synon. *BUGULA UMBELLA,* Smitt.

Kritisk Förteckning öfver Skandinaviens Hafsbryozoer, 1868, Pag. 353, Tab. 30.

Polyzoariet er bøieligt og har en meget kort Stilk, hvorfra udstraale skjærmformigt 4 store Hovedgrene, som dichotomisk spalte sig (Tab. 12, Fig. 9, 10). Zooecierne, der ere 0,58 Mm. lange, 0,31 Mm. brede foroven og 0,18 Mm. forneden, sidde afvexlende i to Rader, ere halvgjennemsigtige, aflange, smale, næsten tilspidsede nedad, hvilket især er fremtrædende paa den bagerste Flade; opad derimod ere de brede, tilrundede med en skjæv Rand, der gaar indenfra udad, nedenfra opad, hvorved det indre, øvre Hjørne bliver afrundet, medens det ydre, øvre, bliver mere vinklet (Fig. 11, 12). Zooeciets Aabning er oval, og findes paa den øverste Del af den forreste Flade, der forøvrigt indtages af den saakaldte Mundarea (Fig. 12 e, e). Fra Midtpartiet af Zooeciets øverste Hvælv, nærmere den forreste Rand, udgaar en stærk hornagtig Apophyse, hvis Basis er bred og hvis øverste frie, smalere Del er afrundet (Fig. 12 f, f). Hvor Grenen deler sig, findes paa det Zooecium, hvorfra Delningen udgaar, to saadanne Apophyser, der da antage en divergerende Stilling og rykke nærmere ud mod Hjørnerne (Fig. 12 f'). Disse Apophyser tjene til Insertionspunkter for en stærk Muskel, der udbreder sig straaleformigt opover det overliggende Zooeciums forreste Flade imod Mundaabningen, imedens den temmelig tykke Tendo fæster sig paa det underliggende Zooeciums Apophyse (Fig. 8 b). Zooeciets forreste Flade er temmelig flad, tynd og besat med spredte Kalkkorn (Fig. 12); den bagerste Flade, der er mere convex, er stærkt stribet paatvers. Striberne ere ophøiede og have en skjæv Retning nedenfra opad, udenfra indad, og ere paa den øverste Del mere divergerende (Fig. 11 b). Avicullariet sidder paa det øvre, ydre Hjørne af Zooeciet, nærmer sig Formen af et Ørnehoved, er kortstilket og leddet (Fig. 11 d, d). Underkjæven er sculpteret med radiære Tegninger, og det stærkt krummede Overnæbs Sider ere vingede (Fig. 13, 14); Issen er meget hvælvet, og Stilkens øverste Del strækker sig et Stykke op paa Nakken, med hvilken den articulerer. Ooecier have vi

in which a movement has been observed, that can have any resemblance to the movement we have indicated; there is nevertheless an essential difference; as also we are not aware, that in this genus there has been observed any special muscular apparatus for the movement.

The first specimen was found by one of us (Danielssen) at Slotholmen in Nordland, at the depth of 80 fathoms on clayey sand bottom. Several years afterwards, we both found simultaneously 3 specimens in the Korsfjord at Bergen, also in clayey sand bottom, but at a depth of 150—200 fathoms.

KINETOSKIAS ARBORESCENS, DAN.

(Tab. 12, fig. 9—14)

Forhandlinger i Videnskabsselskabet i Christiania, Aar 1867, Pag. 23.

Synon. *BUGULA UMBELLA,* Smitt.

Kritisk Förteckning öfver Skandinaviens Hafsbryozoer, 1868, pag. 353, Tab. 30.

The polyzoarium is flexible, and has a very short stem, whence there radiate, umbrella-like, 4 large main branches, which divide themselves dichotomically (Tab. 12, fig. 9, 10). The zooecia, which are 0,58 Mm. long, 0,31 Mm. broad above, and 0,18 Mm. below, are situated alternately in two rows; they are semi-transparent, oblong, narrow, nearly pointed below, which is especially conspicuous on the posterior surface; above, on the contrary, they are broad, rounded, with oblique margin which goes from within outwards, from below upwards, whereby the interior upper angle becomes rounded off, while the exterior upper angle becomes more acute (fig. 11, 12). The aperture of the zooecium is oval, and is situated on the upper part of the anterior surface, which is moreover occupied by the so-called oral area (fig. 12 e, e). From the middle part of the upper convexity of the zooecium, nearer to the anterior margin, there proceeds a strong horny apophysis, the base of which is broad, and the upper, free, narrower extremity of which is rounded off. (fig. 12 f, f). Where the branch divides itself, there are on the zooecium whence the division proceeds, two such apophyses which then assume a divergent position, and extend further out towards the angles (fig. 12 f'). These apophyses serve as points of insertion for a strong muscle, which spreads radially up over the anterior surface of the superincumbent zooecium towards the oral aperture; while the rather thick tendon is attached to the apophysis of the subjacent zooecium (fig. 8 b). The anterior surface of the zooecium is rather flat, thin and covered with scattered calcareous granules (fig. 12); the posterior surface, which is more convex, is strongly striated transversely. The striations are raised, and have an oblique direction from below upwards, from without inwards; and they are more divergent on the upper part (fig. 11 b). The aviculary is situated on the upper exterior angle of the zooecium; it resembles an eagle's head in shape; it is short-stemmed and articulated (fig. 11 d, d). The under

ikke iagttaget paa de to Exemplarer, vi have havt til Undersøgelse. Polypiden er vandklar med 24 lange Tentakler; Maven gul, forsynet med en kort Tarm.

Rodtraaden forholder sig i det Væsentlige paa lignende Maade som paa den foregaaende Art, — dog med nogen Variation. Den tager sin Begyndelse fra Zooeciets nederste og ydre Del (Hjørne) og gaar som en rund Liste over paa Randen af det ældre, underliggende Zooecium, hvor den paa den nederste Del forener sig med den ældre Rodtraad (Fig. 11 a, a). Imellem Zooecierne, der hvor det ældres Top støder til det yngres Grunddel, udgaar fra Rodtraaden en conisk tilspidset halvrund Lap, hvis afrundede frie Del vender udad, og hvis bredere Del ligesom udfylder Rummet mellem begge Zooecierne (Fig. 11 c, c). Ved den nederste (inderste) $^2/_3$ Del af Grenene udbreder Rodtraaden sig til en Membran, der udfylder Grenenes Mellemrum og forener dem med hinanden (Fig. 11 e). Paa Polyzoariets forreste Flade gaar Rodtraaden imellem to Zooecier, udbreder sig ogsaa her membranagtig over Apophyserne og danner en Skede for Muskeltendoen, hvorefter den som en tynd Hinde beklæder hele Zooeciets forreste Flade til opimod Mundaabningen. Endelig udfylder Rodtraaden ved en lignende Membrandannelse de Mellemrum, som fremkomme derved, at Zooeciernes indre Rande ikke ganske støde til hinanden paa Grenen (Fig. 11 f), saa at hvert Zooecium har sin særegne Indfatning, dannet af Rodtraadudbredningen. I denne membranøse Udbredning sees en Mængde finere Kalkpunkter, samt en hel Del lysere, ligesom forgrenede Linier, der vistnok ere de af Smitt antydede Kolonialnerver, men som vi ikke kunne godkjende som saadanne. Rodtraadene forene sig nedad til en yderst kort Stilk, hvorfra de 4 Hovedgrene udgaa. Men foruden denne korte Stilk, der tjener til at befæste Polyzoariet til Sand eller Smaastene, saa findes paa den nederste Del af den forreste Flade af hver Hovedgren 8—10 Rodtraade, der tage Udspring fra den førbeskrevne Membran, som binder saavel Hoved- som Bigrenene sammen. Disse mangfoldige Rodtraade ere temmelig tynde, cylindriske, vandklare, og omgive den egentlige Stilk som en Søilering, idet ogsaa de fæste sig til Smaasten eller Sandkorn. (Fig. 9).

Ogsaa denne Art har en selvstændig Bevægelse, ligesom den foregaaende, hvortil det beskrevne Muskelapparat tjener. Hvert Zooecium paa Colonien har sin særskilte stærke Muskel, der tjener det til Bevægelse. Naar dette Muskelapparat er sat i Virksomhed, bevæger en større eller mindre Del af Grenene sig paa den Maade, at de bøies forover, hvorved den forreste Flade bliver den underste, og den bagerste bliver den øverste. Naar samt-

jaw is sculptured with radiary markings; and the sides of the strongly curved upper beak are winged (fig. 13, 14). The crown is much arched; and the upper part of the stem extends some distance up on the back of the head, with which it is articulated. We have not observed any ooecia in the two specimens we have had to examine. The polypide is pellucide, with 24 long tentacles; the stomach is yellow, and has a short intestine.

The rootlet is essentially as in the species previously described, — yet with some variation. It takes its beginning from the lower and outer part (angle) of the zooecium, and goes like a round fillet over on to the margin of the older subjacent zooecium, where it unites itself on the lower part with the older rootlet (fig. 11 a, a). Between the zooecia, where the top of the older one joins the base of the younger, there issues from the rootlet a conically tapered semi-globular lobe, the rounded free part of which points outwards, and the broader part of which, as it were, fills the space between both the zooecia (fig. 11 c, c). At the lower (innermost) $^2/_3$ of the branches, the rootlet expands into a membrane, which fills the interval between the branches and unites them to each other (fig. 11 e). On the anterior surface of the polyzoarium, the rootlet goes between two zooecia, expands also here, membrane-like, over the apophyses, and forms a sheath for the tendon of the muscle, after which it covers, like a thin membrane, the whole of the anterior surface of the zooecium until up towards the oral aperture. Finally the rootlet, by a similar membranous formation, occupies the intervals produced by the interior margins of the zooecia not being quite contiguous on the branch (fig. 11 f); so that each zooecium has its own enclosure formed by the expansion of the rootlet. In this membranous expanse, there appear a number of finer calcareous points and a number of lighter, as it were, ramified lines, which are certainly the colonial nerves indicated by Smitt, but which we cannot acknowledge as such. The rootlets connect themselves below in an extremely short stem, whence proceed the 4 main-branches. But besides this short stem, which serves to attach the polyzoarium to sand or small stones, there are on the lower part of the anterior surface of each main-branch, 8—10 rootlets, which take their issue from the membrane previously described, connecting as well the main-branches as the subsidiary branches together. The numerous rootlets are rather thin, cylindrical, pellucid, and surround the proper stem like a ring of columns, attaching themselves also to small stones or grains of sand (fig. 9).

Also this species has an independent movement, like the former, effected by the muscular apparatus described. Each zooecium in the colony has its separate strong muscle which serves it for movement. When this muscular apparatus is brought into activity, a greater or a less number of branches move so that they are bent forward, whereby the anterior surface becomes the undermost, and the posterior, the uppermost. When all the contracting

lige Zooeciers Contractionsmuskler bevæge sig, bøie Grenene sig saa stærkt sammen, at Polyzoariet danner næsten en Kugle, og da skjules ganske baade den korte Stilk og de den omgivende Rodtraade; ophører Contractionen, antage Grenene en næsten opret Stilling, men da hele Coloniens Dyr sjelden benytte Contractionsmusklerne samtidigt, saa antage Grenene ofte meget smukke, bløde Former.

To Exemplarer af denne Art bleve fundne af Danielssen ved Vadsø paa 90 Favnes Dyb, leerholdig Sandbund. Et Exemplar er fundet ved Spitsbergen af Professor Lovén.

SLÆGTEN *KINETOSKIAS*[1])
CHARACTERISERES:

Polyzoariet forsynet med Stilk, hvorfra dichotomiske, bevægelige Grene, sammenbundne i kortere eller længere Udstrækning ved en Membran, udstraale skjærmformigt. Zooecierne afvexlende, biseriale, langstrakte, næsten omvendt coniske, forsynede med en eller to Apophyser. Hvert Zooecium har en særskilt Bevægelsesmuskel.

KINETOSKIAS SMITTII
CHARACTERISERES:

Polyzoariet skjærmformigt, langstilket med 4 Hovedgrene, forenede ved en Membran. Zooecierne langstrakte, omvendt coniske, tverstribede paa den bagerste Flades nederste Del, og forsynede med en Torn paa det øvre, ydre Hjørne samt 1 eller 2 Apophyser paa den øverste forreste Rand, hvorfra Bevægelsesmuskelen udspringer. Avicullariet siddende, fladtrykt og meget forlænget bagtil.

KINETOSKIAS ARBORESCENS
CHARACTERISERES:

Polyzoariet kortstilket, udstraalende skjærmformigt med 4 Hovedgrene. Disse, saavelsom Bigrenene ere forenede i stor Udstrækning ved en Membran. Zooecierne aflange, næsten kølleformige, forsynede paa deres øverste Hvælv med 1 eller 2 Apophyser (Fæstepunkter for Bevægelsesmuskelen), Zooeciernes forreste Flade indtages for Størstedelen af Mundareaen; den bagerste Flade er planconvex, stribet. Aviculariet stilket, leddet, siddende paa det øvre, ydre Hjørne.

Smitt har i sin kritiske Fortegnelse over Skandinaviens Hafsbryozoer givet en Beskrivelse over Kinetoskias arborescens under Benævnelsen Bugula umbella; men da Danielssen allerede tidligere havde beskrevet den under førstnævnte Navn, have vi bibeholdt dette. Smitt har erkjendt, at denne Bryozo skiller sig i sin Form betyde-

[1]) Af *κινητός*, bevægelig; *σκίας* en Solskjærm.

muscles of the zooecium move themselves, the branches are bent so strongly together that the polyzoarium nearly forms a globe, and then both the short stem and the rootlets which surround it, are entirely concealed; when the contraction ceases, the branches assume a nearly erect position; but as the animals of the whole colony seldom employ the contracting muscles at the same time, the branches often acquire very beautiful soft forms.

Two specimens of this species were found by Danielssen at Vadsø, at the depth of 90 fathoms, on clayey sand bottom; one specimen was found at Spitsbergen by Professor Lovén.

THE GENUS *KINETOSKIAS*[1])
IS CHARACTERISED:

The polyzoarium furnished with a stem, whence dichotomical movable branches, connected in a shorter or longer extent by a membrane, radiate umbrella-like. The zooecia alternating, biserial, elongated, nearly inverted-conical, provided with one or two apophyses. Each zooecium has a separate motor muscle.

KINETOSKIAS SMITTII
IS CHARACTERISED:

The polyzoarium umbrella-shaped, elongated, with 4 main-branches connected by a membrane. The zooecia elongated, inverted-conical, transversely striated on the lower part of the posterior surface, and armed with a spine on the upper exterior angle, with 1 or 2 apophyses on the upper anterior margin, whence the motor muscle issues. The aviculary sessile, depressed and very much elongated backwards.

KINETOSKIAS ARBORESCENS
IS CHARACTERISED:

The polyzoarium short-stemmed, radiating umbrella-like, with 4 main branches. These, as well as the subsidiary branches, are connected in a great extent by a membrane. The zooecia are oblong, nearly claviform, having on their upper convexity 1 or 2 apophyses (points of attachment for the motor muscle). The anterior surface of the zooecia is occupied for the greater part by the oral area; the posterior surface is plano-convex and striated. The aviculary pedunculated, articulated and situated on the upper exterior angle.

Smitt has, in his critical lis of the sea Bryozoa of Scandinavia, given a description of the Kinetoskias arborescens, under the denomination Bugula umbella; but as Danielssen has already previously described it under the first name, we have retained it. Smitt has acknowledged that this Bryozoon differs considerably in its form from

[1]) From *κινητός*, movable; *σκίας*, a parasol.

lig fra Bugulaerne, men har dog troet at burde henføre den til Bugula-Slægten. Vi formene, at denne Art, ligesaalidt som den anden af os beskrevne, nemlig K. Smittii, kan med Rette optages i Bugula-Slægten, da de dog væsentlig adskille sig fra denne. Ikke alene Zooeciernes Form og den eiendommelige Rodtraadsformation, hvorved en Grenene sammenbindende Membran dannes, men ogsaa det særegne Muskelapparat, hvormed hvert Zooecium er forsynet, og som tjener til Bevægelse for dette, fjerner disse vore to Arter i saa høi Grad fra Bugula-Slægten, at vi finde det vel begrundet at danne en ny Slægt for dem.

FORKLARING OVER FIGURERNE:

Tab. 3, Fig 12. Kinetoskias Smittii, naturlig Størrelse.
Fig. 13. En Gren noget forstørret; *a, a* Zooecier; *b* Polypid.
Fig. 14. Et Zooecium med Polypid, stærkt forstørret; *a* Zooecium; *b* Polypid; *c* Mave; *d* Retractor.

Tab. 12, Fig. 4. K. Smittii. En Gren forstørret, seet fra den bagerste Flade; *a, a* Forlængelse af Rodtraaden; *b* den trekantede Hudlap; *c, c* Tverstriberne paa Zooeciernes nederste, bagerste Flade; *d, d* Tornen paa det øverste, yderste Hjørne; *e* Mundaabning; *f* spiralformig Retractor; *g* Avicularіet.

Fig. 5. Et Avicularium, forstørret.
Fig. 6. En Gren lidt forstørret; *a, a* Apophysen; *b, b* Muskler; *c, c* Ooecier; *d* membranagtig udvidet Rodtraad mellem to Grene.
Fig. 7. En Gren lidt forstørret, seet fra Siden for at vise Musklerne.
Fig. 8. Et Stykke af en Gren, stærkt forstørret; *a, a* Apophyse; *b, b* Muskel; *c, c* to Apophyser paa et Zooecium; *d, d* den trekantede Hudlap; *e, e* den membranagtige Udbredning af Rodtraaden.
Fig. 9. Kinetoskias arborescens, naturlig Størrelse.
Fig. 10. Nogle Grene, lidt forstørret.
Fig. 11. En Gren fra Bagsiden, forstørret; *a, a* Rodtraaden; *b* Tverstriberne paa Bagsiden af Zooeciet; *c* den trekantede Hudlap; *d, d* Avicularier; *e* Rodtraadens Udbredning imellem to Grene; *f* Rodtraadens Udbredning imellem to Zooecier.
Fig. 12. To Grene fra Forsiden, forstørret; *a, a* Rodtraaden; *b, b* Kalkpunkter paa Zooeciets forreste Flade; *d, d* Avicularier; *e, e* Mundaabning; *f''* den trekantede Hudlap; *f, f* Apophysen; *f'* to Apophyser.
Fig. 13. Et Avicularium, seet fra Siden, forstørret.
Fig. 14. Et Avicularium, seet nedenfra, forstørret.

the Bugulas; but he has considered that he ought to refer it to the Bugula-genus. We presume that this species can not, any more than the other described by us, namely K. Smittii, be properly admitted into the genus Bugula; as they are essentially different from it. Not only the shape of the zooecia, and the peculiar formation of the rootlets, by which a membrane connecting the branches is formed, but also the peculiar muscular apparatus, with which each zooecium is provided, and which serves to move it, separate these our two species so widely from the genus Bugula that we find the formation of a new genus for them fully authorised.

EXPLANATION OF THE FIGURES.

Tab. 3, fig. 12. Kinetoskias Smittii, natural size.
Fig. 13. A branch slightly magnified: *a, a* zooecia; *b* polypid.
Fig. 14. A zooecium with polypide strongly magnified. *a* zooecium; *b* polypid; *c* stomach; *d* retractor.

Tab. 12, fig. 4. K. Smittii; a branch magnified viewed from the posterior surface: *a, a* continuation of the rootlet; *b* the triangular lobe of skin; *c, c* transverse stripes on the lower posterior surface of the zooecia; *d, d* the spine on the upper outer corner; *e* the oral aperture; *f* spiral retractor; *g* the aviculary.
Fig. 5. An aviculary, magnified.
Fig. 6. A branch slightly magnified: *a, a* the apophysis; *b, b* the muscle; *c, c* ooecia; *d* membranous enlarged rootlet between two branches.
Fig. 7. A branch, slightly magnified, viewed from the side to shew the muscles.
Fig. 8. Part of a branch strongly magnified: *a, a* apophysis; *b, b* muscle; *c, c* two apophyses on a zooecium; *d, d* the triangular lobe of skin; *e, e* membranous enlargement of the rootlet.
Fig. 9. Kinetoskias arborescens, natural size.
Fig. 10. Some branches slightly magnified.
Fig. 11. A branch from the posterior side, magnified: *a, a* the rootlet; *b* the transverse stripes on the posterior side of the zooecium; *c* the triangular lobe of skin; *d, d* the avicularies; *e* enlargement of the rootlet between two branches; *f* enlargement of the rootlet between two zooecia.
Fig. 12. Two branches, front view, magnified. *a, a* the rootlet; *b, b* calcareous specks on the anterior surface of the zooecium; *d, d* avicularies; *e, e* oral aperture; *f''* the triangular lobe of skin; *f, f* the apophysis; *f'* two apophyses.
Fig. 13. An aviculary viewed from the side, magnified.
Fig. 14. An aviculary viewed from below, magnified.

BIDRAG
TIL
DE NORSKE GEPHYREERS NATURHISTORIE.
AF
J. KOREN & D. C. DANIELSSEN.

Gephyreerne høre til den Klasse af Dyr, der af de norske Naturforskere ikke have været skjænket synderlig Opmærksomhed, og det vistnok af den Grund, at Undersøgelserne frembød en god Del Vanskeligheder, der neppe stod i Forhold til det videnskabelige Udbytte, som muligens kunde udvindes.

Jens Rathke er, saavidt os bekjendt, den Første, som fra vore Kyster omtaler i sine „Iagttagelser, henhørende til Indvoldsormenes og Bløddyrenes Naturhistorie, 1799“, et Dyr, som efter alt at dømme har været Phascolosoma Strombi v. capitatum. Senere har M. Sars i forskjellige Afhandlinger omtalt og opregnet de af ham fundne Arter, af hvilke han har beskrevet tvende Phascolosoma-Arter. Af fremmede Naturforskere have kun H. Rathke og Keferstein beskrevet nogle enkelte Arter her fra Kysten. Derimod have Gephyreerne allerede fra Aarhundredets Begyndelse været Gjenstand for grundige og vidtløftige Undersøgelser, hvis Resultater til forskjellige Tider ere offentliggjorte i større og mindre Afhandlinger, fornemmelig ved: Rolando, Delle Chjaie, Krohn, Grube, Lovén, Quatrefages, Diesing, Schmarda, M. Müller, Claparède, Semper, Oscar Schmidt, Ehlers & Keferstein.

Da vi i Aarenes Løb paa vore zoologiske Excursioner have fundet flere nye Former, og da Kundskaben om de nordiske Gephyreer forekom os at være sparsom, fandt vi os opfordrede til at skjænke denne i vor Fauna temmelig forsømte Dyrklasse noget mere Opmærksomhed, end der hidtil var bleven den tildel, og derfor fremkomme disse Bidrag.

De anatomisk-histologiske Undersøgelser, vi have anstillet, gjelde Sipunculiderne; og omend vi fuldt ud erkjende, at vi langtfra have været istand til at udtømme Alt, tro vi dog at kunne levere et Supplement til hvad der tidligere er gjort.

HUDEN.

Den egentlige Overhud (Cuticula) er mere og mindre tyk, mere og mindre ujævn, og dannes af flere Lag, der have en yderst fin Stribning. Under denne ligger Epithel-

CONTRIBUTION
TO
THE NATURAL HISTORY OF THE NORWEGIAN GEPHYREÆ.
BY
J. KOREN & D. C. DANIELSSEN.

The Gephyreæ belong to a class of animals to which the Norwegian naturalists have not devoted much attention, and that most probably by reason of the investigation being connected with many difficulties that stand in no reasonable proportion to the scientific result, which might possibly be obtained.

Jens Rathke is, as far as we know, the first who from our coasts mentions, in his „Iagttagelser henhørende til Indvoldsormenes og Bløddyrenes Naturhistorie, 1799“, an animal which, judging from all we know, must have been Phascolosoma Strombi v. capitatum. Afterwards M. Sars has, in various treatises, mentioned and enumerated the species found by him, of which he has described two species of Phascolosoma. Among foreign naturalists, only H. Rathke and Keferstein have described some few species from the Norwegian coast. On the other hand, the Gephyreæ have, already from the beginning of the century, been the subject of thorough and extensive investigations, the results of which have been at various times made public, in larger or smaller treatises. chiefly by: Rolando, Delle Chjaie, Krohn, Grube, Lovén, Quatrefages, Diesing, Schmarda, M. Müller, Claparède, Semper, Oscar Schmidt, Ehlers & Keferstein.

Having in the course of many years, on our zoological excursions, found many new forms, and as the knowledge of the northern Gephyreæ appeared to us to be scanty, we felt ourselves called upon to devote to this class of animals, which in our fauna has been rather neglected, a somewhat greater measure of attention than has hitherto been conceded; and therefore these contributions appear.

The anatomical-histological investigations which we have instituted, relate to the Sipunculidæ; and although we fully acknowledge that we have been far from able to exhaust everything, we still think that we may furnish a supplement to what has been formerly done.

THE SKIN.

The proper outer skin (cuticula) is more or less thick, more os less uneven, and is formed of several layers which have an extremely fine striation. Under this

laget, der hos de fleste af de Arter, vi have undersøgt, bestaar af større og mindre polyedriske Celler, — ja hos enkelte, som f. Ex. Sipunculus priapuloides, opnaa disse Celler en betydelig Størrelse, ere forsynede med Kjerner og et rigt, kornet Protoplasma-Indhold (Tab. 13, Fig. 9 h, h). Dette Epithel hviler paa en Slags Basalmembran, der bestaar af et fint Bindevæv. Hos vore Sipunculider, der alle ere temmelig smaa, har det ikke lykkedes os at separere denne Basalmembran fra Epithellaget, hvorved en særskilt Hud (Cutis) kunde fremkomme; men fra den underste Flade af Basalmembranen have vi fundet en Membran udgaa, der forlænger sig imellem baade Ring- og Længdemusklerne og gaar over i den Hinde (Peritoneum), der beklæder Kropshulheden, og som vi senere komme til at omtale. Vi have ikke fundet at Basalmembranen (Cutis) har et saadant krydsformigt, stribet Udseende, som Keferstein angiver at være Tilfældet hos Phascolosoma Antillarum og Puntarenæ. Graber benægter ligefrem Tilstedeværelsen af denne krydsformige Stribning.

De i Hudeu hos Sipunculiderne indleirede Hudlegemer have vistnok hos alle de Arter, vi have havt Anledning til at undersøge, en forsaavidt overensstemmende Character, som de indeslutte en Celleansamling og udmunde gjennem Cuticula; men de frembyde dog betydelige individuelle Forskjelligheder, hvilke vi nu skulle fremhæve. Hos vore to Sipunculus-Arter ligge de meget løse under Epithellaget og altid omgivne af en tynd Kapsel (Tab. 13, Fig. 9 c, b). Deres Indhold bestaar dels af et større Antal mindre Celler (Fig. 9 b), dels kun af to store mod hinanden fladtrykte, halvkugleformige Celler, der hver er forsynet med en stor Vacuole (Fig. 9 c). Hos Slægterne Phascolosoma, Onchnesoma og Tylosoma ligge Hudlegemerne enten, saaledes som Tilfældet er hos Ph. squamatum, aflangt fladtrykte mellem Matrix (Hypodermen) og Ringmusklerne med en lang Udførselskanal (Tab. 14, Fig. 15 a, b), eller de ligge ligesom indkrængede (indkapslede) i Cuticula, som hos Ph. Lovénii (Tab. 14, Fig 21), og tildels hos Ph. Strombi — nemlig de Hudlegemer, som hos denne Art danne Prominentser af Huden og ere omgivne af en hesteskoformig Cuticularfortykkelse, saaledes som af Keferstein[1]) beskrevet. Hos Ph. vulgare ligge Hudlegemerne kun for endel indi Cuticula; de have en Kegleform, men Keglens Basis hviler lige paa Ringmusklerne, og her ere de tydelig omgivne af en Kapsel, der dannes af Basalmembranen. De hos Ph. Lovénii i Cuticula indkapslede Hudlegemer synes derimod ikke at være omgivne af en saadan Kapsel. De ere bugede, næsten krukkeformige (Fig. 21) med en smal Grunddel, hvorigjennem sees tydeligt, at Epithellaget gaar ind og beklæder hele Fladen af den Kapsel, der er dannet af Cuticula (Fig. 21 a, a) og hvori Hudlegemets mægtige cylindriske, opad noget tilspidsede Celler ligge frit (Fig. 21 d). Hos Ph. squamatum og Onchnesoma Steenstrupii ere disse Celler hverken saa store eller cylindriske som

[1]) Zeitschrift f. w. Zoologie 15 B. 1865, Pag. 406, Tab. XXXIII, Fig. 35 og Pag. 431.

lies the epithelial layer, which, in most of the species we have examined, consists of larger and smaller polyhedral cells; nay in some — as for instance Sipunculus priapuloides, — these cells attain a considerable size, contain nuclei and a rich granulated protoplasma (Tab. 13, fig. 9 h, h). This epithelium rests on a sort of basal membrane, which consists of a fine connecting tissue. In our Sipunculidæ, which are all rather small, we have not been able to separate this basal membrane from the epithelial layer, so as to produce a separate skin (cutis); but we have found that, from the under surface of the basal menbrane, there issues a membrane which extends both among the annular and longitudinal muscles, and goes over into the membrane (peritoneum) that lines the perivisceral cavity, and which we shall mention hereafter. We have not found that the basal membrane (cutis) has such a cross-striped appearance as Keferstein states is seen in Phascolosoma Antillarum and Puntarenæ. Graber denies absolutely the existence of this cross-striping.

The cuticular bodies (Hautkörper) imbedded in the skin of the Sipunculidæ, have certainly, in all the species we have had occasion to examine, a so far similar character, as they include a collection of cells, and have their exeretory-orifice through the cuticle; but they yet exhibit important individual differences, which we shall now specify. In our two species of Sipunculus, they lie very loose under the epithelial layer, and are always surrounded by a thin capsule (Tab. 13, fig. 9 c, b). Their contents consist partly of a larger number of smaller cells (fig. 9 b), partly only of two large semi-globular cells, flattened against each other and having each a large vacuole (fig. 9 c). In the genera Phascolosoma, Onchnesoma and Tylosoma, the cuticular bodies either lie, as in the Ph. squamatum, flattened oblong between the matrix (Hypodermis) and the annular muscles, with a long eductive canal (Tab. 14, fig. 15 a, b), or they lie, as it were, invaginated (incapsulated) in the cuticle, as in Ph. Lovénii (Tab. 14, fig. 21), or sometimes in Ph. Strombi; namely the cuticular bodies which in the latter species form prominences in the skin, and are surrounded by a cuticular enlargement in the form of a horse-shoe, as described by Keferstein[1]). In Ph. vulgare, the cuticular bodies only lie partly within the cuticle; they have a conical form; but the base of the cone rests directly on the annular muscles; and here they are evidently surrounded by a capsule formed of the basal membrane. The incapsulated cuticular bodies in the skin (Cuticula) of the Ph. Lovénii seem, on the other hand, not to be enveloped in such a manner. They are bellied so as to be nearly pot-shaped (fig. 21) with a narrow base, through which it may distinctly be seen that the epithelial layer goes in and lines the whole surface of the capsule, which is formed of the cuticle (fig. 21 a, a) and wherein the strong cylindrical cells (above somewhat tapered) of the

[1]) Zeitschrift f. w. Zoologi, 15 Vol. 1865, p. 406, Tab. XXXIII, fig. 35 and p. 431.

hos den nys nævnte Art. Paa alle de af os undersøgte Arter af Phascolosoma, Onchnesoma og Tylosoma fandtes der i Centrum af Hudlegemerne, eller op imod deres Udførselskanal en Slags Hule, hvori paa hærdede Præparater altid saaes en coaguleret Masse, der neppe kunde være andet end stivnet Slim (Fig. 21 f). Den Særegenhed, der findes hos Ph. Strombi, nemlig at der i Cuticula omkring Aabningen af en Del af Hudlegemerne forekommer et Pigment, — gjenfandt vi hos Ph. Lovénii ved alle Hudlegemerne. Pigmentet er her gulgrønt, ligger mod Cuticulas Overflade, som tæt sammenpakkede, kantede Legemer (Fig. 21 g, g), hvorimod det længere borte fra Aabningen er mere spredt og har et straalet, næsten krystallinsk Udseende (Fig. 21 h, h). Hos Onchnesoma Steenstrupii forekommer et lignende Pigment, men ikke saa grovkornet, og heller ikke omkring Hudlegemernes Aabning; — her danner det smaa paa Cuticula fremragende Klumper (Tab. 15, Fig. 34 a, a, a), der over hele Snabelen indtage en meget regelmæssig, ringformig Anordning. Nedover Kroppen taber det sig, men findes ogsaa her, dog temmelig spredt.

Hudlegemerne hos Sipunculiderne ere forsynede med Nerver, saaledes at der til hvert Legeme gaar en Nervestreng ind igjennem Basaldelen, og synes at tabe sig hos nogle Arter i Kapselen. Nogen Sikkerhed med Hensyn hertil har det ikke været os muligt at komme til, selv med de stærkeste Forstørrelser. Baade Leydig, Semper, Ehlers og Keferstein have paavist disse Nerver; og Leydig opstillede den Mening, at Hudlegemerne vare Nerveende-Apparater, hvortil Ehlers og Keferstein sluttede sig, — idet de forlod deres tidligere havte Anskuelse, nemlig den, at Hudlegemerne vare Secretionsorganer. Graber derimod benægter ganske Tilstedeværelsen af Nerver. At han ingen saadanne har fundet paa de Phascolosoma-Arter, han har undersøgt, er klart nok; men deraf at drage den Slutning, at ingen Nerver findes, forekommer os at være temmelig voveligt, al den Stund de af meget dygtige Forskere ere paaviste. Vi kunne godt forstaa, at Graber ikke har fundet de her omtalte Nerver hos Phascolosomaerne; thi de ere her saa ulige langt vanskeligere at demonstrere, end hos Sipunclerne, især paa hærdede Præparater, og dog tør det hænde, at Graber virkelig har seet Nervestrengen, der gaar ind i Hudlegemet, men antaget den for at være en Prolongation af en Ringmuskelstreng. Vi skulle kun her bemærke, at Nervestrengen efter Døden er i sit Udseende noget forskjellig fra hvad den er i levende Live, — den antager nemlig en kornet Structur; og Graber har jo kun havt døde og i Spiritus opbevarede Exemplarer til sine Undersøgelser. Hos Onchnesoma Steenstrupii sees Hudlegemernes Nerver forholdsvis let i den tyndhudede Snabel hos det levende, eller bedre hos det døende Dyr.

cuticular body lie freely (fig. 21 d). In the Ph. squamatum and Onchnesoma Steenstrupii, these cells are neither so large nor so cylindrical as in the species last named. In all the species which we have examined of the Phascolosoma, Onchnesoma and Tylosoma, there was found in the centre of the cuticular bodies, or up towards their eductive canal, a sort of cavity, wherein in hardened preparations there could always be discerned a coagulated mass, which could scarcely be anything else but stiffened mucus (fig. 21 f). The peculiarity observed in the Ph. Strombi, namely that a pigment appears round about the aperture of a part of the cuticular body, was also recognised by us in Ph. Lovénii in all the cuticular bodies, The pigment is here yellowish green, and lies against the surface of the cuticle in the form of closely packed angular bodies (fig. 21 g, g), while further from the aperture it is more diffused, and has a radiating nearly crystalline appearance, (fig. 21 h, h). In the Onchnesoma Steenstrupii, there appears a similar pigment; but it is not so coarsely granulated, nor found around the aperture of the cuticular bodies. In this species it forms small prominent lumps on the cuticle (Tab. 15, fig. 34 a, a, a) which occupy on the whole proboscis a very regular annular arrangement. On the lower part of the body it nearly disappears, but is still here and there visible, though much diffused.

The cuticular bodies in the Sipunculidæ possess nerves; so that to each body there goes a nervous cord in through the basal part, and appears in some species to lose itself in the capsule. It has not been possible for us to arrive at any certainty in this respect, even with the most powerful magnifiers. Leydig, Semper, Ehlers and Keferstein have pointed out these nerves; and Leydig emitted the opinion that the cuticular bodies were the terminal apparatus of nerves; in which opinion Ehlers and Keferstein concurred, abandoning their former views, that the cuticular bodies were organs of secretion. On the other hand Graber denies entirely the existence of nerves. That he has not found any in the species of Phascolosoma which he has examined, is clear enough; but thence to draw the inference that there are none, appears to us to be rather rash, seeing that very able naturalists have pointed them out. We can well understand that Graber has not found the nerves here noticed in the Phascolosoma; as they are so incomparably more difficult to indicate than in the Sipunculus, especially in hardened preparations; and yet it is possible that Graber really has seen the nervous cord entering the cuticular body, but presumed it to be a prolongation of an annular muscle-fibre. We shall only here remark that the nervous cord is after death rather different in appearance from what it is during life; as it assumes a granulated structure; and Graber has had only dead specimens and specimens preserved in spirit to examine. In the Onchnesoma Steenstrupii, the nerves of the cuticular body are comparatively easy to see in the thin-skinned proboscis of the living animal, or still better in the dying animal.

Hvad disse Hudlegemers Function betræffer, saa har derom hersket forskjellige Meninger. Ifølge vore Undersøgelser maa vi med Bestemthed erklære dem for Afsondringsorganer. Vi have paa levende Dyr seet Slim i Form af Traade komme udaf Aabningerne for disse Organers Udførselskanaler, ligesom vi have fundet coaguleret Slim indeni dem. Hos flere af vore Phascolosoma-Arter findes ogsaa Slim paa Kroppens Overflade, især hos Ph. squamatum, hvis ujævne Hud som Regel er dækket af et Lag ved Slim sammenbundet Smaasand. Oscar Schmidt[1]) har angivet, at Aspidosiphon Mülleri afsondrer temmelig meget Slim, der skal spille en Rolle ved Udhulingen af de Gange i Kalkstenen, hvori Dyret lever, — ligesaa have vi ofte iagttaget at Bonellia viridis afsondrer Slim, saa Slimsecretioner hos Gephyreerne ikke ere saa særegne endda.

Hudlegemernes Form og indre Bygning tør blive et godt Hjælpemiddel for Artens Diagnose, naar de først ere tilstrækkelig kjendte hos en Mængde Arter. Vi have ikke havt Materiale nok til at kunne opstille noget Bestemt i saa Henseende; men skulde det virkelig vise sig saa, hvad vi have en svag Formodning om er Tilfældet, at Hudlegemernes Form og Bygning er forskjellig hos de forskjellige Arter, — da vil Bestemmelsen af disse Dyr, der i deres Ydre ofte ere meget vanskelige at adskille, blive betydelig lettet.

MUSCULATUREN.

Foruden de to vel bekjendte Lag af Ring- og Længdemuskler, der hos Sipunclerne danne særskilte Bundter, som give Huden et gittret Udseende, medens de hos Phascolosomaerne i Regelen danne en sammenhængende Muskelhud, og kun hos enkelte Arter antage Form af Bundter, have vi hos vore to nye Sipunculus-Arter fundet et tredie Lag, som vi have kaldt Skraamuskellaget. Det ligger imellem Ring- og Længdemusklerne i særskilte Bundter, som udgjøre i Antal neppe Halvdelen af Længdemusklernes. Hver Bundt er meget smalere end Længdemuskelen og løber paaskraa rundt Kroppen (Tab. 13, Fig. 10 s, s, s).

Med Hensyn til den Del af Muskelsystemet, der optræder som selvstændige Muskler for Snabelen, og er kaldet Retractorer, saa have vi fundet, at de baade i Form, Antal og Befæstningssteder variere overmaade meget. Hvad nu Formen betræffer, saa er den hos enkelte næsten rund og danner ligesom en Søile, der staar i Midten af Kropshulheden som f. Ex. hos Onchnesoma Steenstrupii; hos andre ligner den en fladtrykt Cylinder, som hos Ph. squamatum, hos atter andre er den ganske flad, hvilket er det almindeligste. Antallet er hos alle de os bekjendte

[1]) Ueber den Bau und die systematische Stellung von Aspidosiphon Mülleri, Dies: Mittheilungen d. naturwissensch. Vereines für Steyermark, 3. H. 1865, Pag. 56.

Destoværre have vi ikke havt Originalafhandlingen, men kjende den kun gjennem andre Forfattere.

As regards the functions of these cuticular bodies, different opinions have been entertained. According to our investigations, we must assuredly declare them to be organs of secretion. We have seen in living animals mucus in the form of threads coming out of the apertures of the eductive canals of these organs, as also we have found coagulated mucus inside them. In many of our species of Phascolosoma, there is also found mucus on the surface of the body, especially in the Ph. squamatum, the uneven skin of which is usually covered with a coat of fine sand bound together with slime. Oscar Schmidt[1]) has stated that the Aspidosiphon Mülleri secretes a good deal of slime, which is said to play a part in the excavation of the galleries in the lime-stone wherein the animal lives; — as also we have frequently observed that Bonellia viridis secretes slime; so that the mucous secretion in the Gephyreæ may probably not be so very peculiar.

The form and interior structure of the cuticular bodies may furnish a good auxiliary for the diagnosis of the species, when they are sufficiently well known in a number of species. We have not had materials enough to establish anything decided in this respect; but if it should really prove to be the case, as we have some reason to anticipate, that the form and structure of the cuticular bodies are different in the different species — then the diagnosis of these animals, which are often very difficult to distinguish by their exterior, will be considerably facilitated.

THE MUSCULAR SYSTEM.

Besides the two well known layers of annular and longitudinal muscles, which in the Sipunculiform separate fascicles, giving to the skin a latticed appearance, while in the Phascolosoma they usually form a connected muscular membrane, and only in some few species assume the form of fascicles, we have in our two new species of Sipunculus found a third layer, which we have called the oblique muscular layer. It is situated between the annular and longitudinal muscles and lies in separate fascicles which are in number about half that of the longitudinal muscles. Each fascicle is much smaller than the longitudinal muscle, and runs obliquely round the body (Tab. 13, fig. 10 s, s, s).

With respect to the part of the muscular system which appears as the independent muscles for the proboscis called retractors, we have found that they vary to a remarkable extent in shape, number and attachment. As regards the shape, it is in some of them nearly round, and forms at it were a column standing in the middle of the perivisceral cavity, as for instance in the Onchnesoma Steenstrupii; in others it resembles a flattened cylinder, as in Ph. squamatum; in others again it is quite flat, which is most usual. The number is, in all the

[1]) Ueber den Bau und die systematische Stellung von Aspidosiphon Mülleri, Dies: Mittheilungen d. naturwissensch. Vereines für Steyermark. 3. H. 1865, p. 56.

Unfortunately we have not had the original treatise, but are acquainted with it only through other authors.

Sipuncler 4; medens det hos Slægterne Phascolosoma, Onchnesoma og Tylosoma er snart 4, snart 2 og endelig kun 1. Hvor der kun er 1, kan Basaldelen enten være ganske udelt (Onchnesoma Steenstrupii), eller den kan være delt i 2 eller flere Rødder. Befæstningsstedet er ogsaa underkastet Afvigelser; saaledes findes Retractorerne fæstede dels i den forreste, dels midterste, og dels bagerste Trediedel af Kroppen.

Saavel hos Sipunculus, som Phascolosoma, Onchnesoma og Tylosoma ere Muskelfibrene lange, glatte, dels runde, dels mere flade, og vise ved stærk Forstørrelse en fin langsgaaende Stribning. I Musculaturen findes et temmelig stort Antal Kjerner; men disse ere ikke placerede indeni Muskelfibrene, men udenpaa dem, ere tildels omgivne af en ringe Mængde Protoplasma (Fig. 9 e, e, e), og maa betragtes som excentrisk liggende Muskelkjerner. Lignende Kjerner findes overalt i det mellem Muskelfibrene tilstedeværende Bindevæv, der danner et Slags Sarcolem, som paa Tversnit faar Udseende af et Netværk, der har en Maske for hver Muskelfiber (Fig. 15 l, l, l, Fig. 21 l). Dette Sarcolem hænger sammen med den Hinde (Peritoneum), der beklæder Kropshulheden. Paa isolerede Muskelfibre lader det sig ei afgjøre, hvad der egentlig tilhører Fiberen og hvad Sarcolemmet, da dette ikke paa nogen Maade udhæver sig fra Muskelfiberen. Graber omtaler cellelignende Legemer, som han har fundet paa Ringmuskellaget, og om hvis Betydning han Intet ved at meddele. Vi skulle være tilbøielige til at tro, at disse Legemer ere de af os paaviste Kjerner med sin Protoplasma-Omgivelse, der tilhører Musculaturen, saafremt de ikke have været fremmede, tilfældige Legemer.

Keferstein angiver, at paa den indre Flade af Kropshulheden er Musculaturen beklædt med en fin Membran, hvori han dog ikke med nogen Tydelighed har kunnet opdage Celledannelse [1]), En saadan Hinde findes saavel hos Slægten Sipunculus, som hos Slægterne Phascolosoma, Onchnesoma og Tylosoma; men den beklæder ikke alene Kropsmusculaturen, men ogsaa Retractorerne, — hvor den er særdeles stærk, — samt Segmentalorganerne, Spiserøret, Tarmen, Nervestrengen og dennes Grene, saa langt som disse ligge frit i Kropshulheden, og er, som allerede nævnt, sammenhængende med det Muskelfibrene omgivende Sarcolem, hvorfra den uden nogen skarp Grændse gaar over i Cutis. Denne fine Membran, som vi herefter ville kalde Peritoneum (Fig. 10 p, p, Fig. 15 p, Fig. 21 p, p), lader sig med temmelig Lethed isolere der, hvor den dækker Musculaturen, og er overalt forsynet med mere eller mindre tætliggende Celler, omgivne af et ciliebærende Protoplasma (Fig. 4 A, p, p). Paa den tynde gjennemsigtige Snabel af Onchnesoma Steenstrupii sees tydeligt, hvorledes saavel Hudens Indflade, som Spiserørets,

[1]) Zeitschrift f. w. Zoologie B. XV, Pag. 407.

Sipunculi known to us, 4; while in the genera Phascolosoma, Onchnesoma and Tylosoma it is sometimes 4, sometimes 2 and even only 1. Where there is only 1, the basal part may either be quite undivided (Onchnesoma Steenstrupii) or it may be divided into 2 or more roots. The point of attachment is also subject to deviations; thus the retractors are found attached partly in the anterior, partly in the middle, and partly in the posterior third part of the body.

As well in the Sipunculus as in the Phascolosoma, Onchnesoma and Tylosoma, the muscular fibres are long, smooth, partly round, partly more flat, and shew, when strongly magnified, a fine longitudinal striation. In the muscular system there appear rather a large number of nuclei; but these are not situated within the muscular fibres, but outside of them; they are partly surrounded by a slight quantity of protoplasma (fig. 9 e, e, e) and must be considered as muscular nuclei in excentric position. Similar nuclei are found everywhere in the connecting tissue, which exists between the muscular fibres, and which forms a sort of sarcolem, having in cross section the appearance of net-work with a mesh for each muscular fibre (fig. 15 l, l, l, fig. 21 l). This sarcolem hangs together with the membrane (peritoneum) which lines the perivisceral cavity. In isolated muscular fibres, one cannot determine what properly belongs to the fibre and what to the sarcolem, as the latter does not in any way distinguish itself from the muscular fibre. Graber mentions cell-like bodies, which he has found in the layer of annular muscles, and as to the signification of which he is unable to give any information. We are inclined to think that these bodies are the nuclei indicated by us, with a surrounding of protoplasma belonging to the muscles; unless they should have been extraneous or fortuitous substances.

Keferstein states that the muscles on the interior surface of the perivisceral cavity are covered with a fine membrane, wherein however he has not been able distinctly to discover any cellular formation [1]). Such a membrane is found as well in the genus Sipunculus as in the genera Phascolosoma, Onchnesoma and Tylosoma; it does not however cover only the muscles of the body, but also the retractors — where it is especially strong — and the segmental organs, the alimentary canal, the intestine, the nervous cord and its branches, as far as these have a free position in the perivisceral cavity; and it is, as already mentioned, continuous with the sarcolem that surrounds the muscular fibres proceeding from the same and going over into the cutis, without any sharply defined boundary. This fine membrane, which we shall hereafter call peritoneum (fig. 10 p, p, fig. 15 p, fig. 21 p, p), may be rather easily isolated where it covers the muscles; and it has everywhere more or less closely-lying cells surrounded by a ciliated protoplasma (fig. 4 A, p, p). On the thin transparent proboscis of the Onchnesoma Steenstrupii, it may

[1]) Zeitschrift f. w. Zoologie B. XV, pag. 407.

Retractorens og Nervestrengens Overflade er besat med disse Celler (Fig. 34 p′, p′, p′), der med deres lange Cilier holde Blodlegemerne i en stadig Circulation. Hos Ph. Lovénii, hvor Peritoneum er meget kjernerigt, viser det ogsaa en fin Stribning, og hos Sipunculus priapuloides indeholder det Muskelfibre. Disse ligge temmelig spredte, men dog regelmæssigt og jevnt fordelte i to Lag, hvis Fibre krydse hinanden under 45° (Fig. 4 A, f, f, Fig. 4 B, f).

Ved Fordøielseskanalen maa vi i det Væsentlige slutte os til Graber, hvad det Histologiske betræffer, medens vi have bibeholdt Ehlers og Kefersteins Inddeling i Spiserør, den egentlige Tarm og Rectum. Hos de to Sipunculus-Arter, der af os ere beskrevne, og som ere de eneste hidtil kjendte i den skandinaviske Fauna, findes ikke de af Ehlers og Keferstein omtalte blindsækformige, buskede Organer, der skulle ligge i Nærheden af Analaabningen, heller ikke den „Wimperfurche“, der løber langs Tarmens indvendige Flade hos Sipunculus nudus; derimod findes hos Sipunculus norvegicus, strax nedenfor Anus paa hver Side af Rectum et lidet kjærtelformigt Organ, der aabner sig i Endetarmen, ligesom vi have fundet hos S. norvegicus og S. priapuloides, samt paa enkelte Phascolosoma-Arter en liden Divertikel paa Rectum, hvilken har været fyldt med det almindelige Tarmindhold.

NERVESYSTEMET.

Foruden det allerede ovenfor Omtalte og det ved Ehlers og Kefersteins Undersøgelser Bekjendte, skulle vi fremhæve, at paa Osmiumspræparater er saavel Bugstrengen, som dens Grene fint stribede, uden noget kornet Udseende, ligeledes paa ganske friske, levende Exemplarer af Onchnesoma Steenstrupii. Der sees rigtignok fine Korn paa Bugstrengen, saaledes som Keferstein angiver det for Sipunculus nudus; men disse Korn tilhøre Cellelaget, der omgiver selve Nervefibrene. Først naar Dyret begynder at dø, bliver baade Bugstrengen og dens Grene kornede.

Hos Onchnesoma Steenstrupii, hvis Bugstreng i Snabelen er overmaade tynd, og derfor let kan examineres gjennem dens hele Tykkelse uden nogen særlig Præparation, findes i Centrum af Nervestrengen talrige Grupper af Nerveceller langs hele Snabelen (Tab. 15, Fig. 35 a, a). Noget Lignende kunde ikke paavises hos andre Arter. De finere Nerveforgreninger ere, paa Grund af deres overordentlige Tyndhed, yderst vanskelige at følge endog paa korte Strækninger hos Phascolosoma- og Onchnesoma-Arter; imidlertid have vi dog forfulgt dem et lidet Stykke, og de vise da omtrent et lignende ganglionært Forhold med udstraalende Grene (Fig. 35 g), som vi nu skulle omtale for Sipunculus's Vedkommende. Hos unge Exemplarer af Sipunculus norvegicus, som ere behandlede med Osmiumsyre og senere farvede med Hæ-

be clearly seen how the interior surface of the skin, as well as the exterior surfaces of the alimentary canal, of the retractor and of the nervous cord are covered with these cells (fig. 34 p′, p′, p′) which with their long cilia keep the blood-globules in a constant circulation. In the Ph. Lovénii, where the peritoneum is very rich in nuclei it exhibits also a fine striation; and in the Sipunculus priapuloides it contains muscular fibres. These are rather dispersed, but yet are regularly and evenly distributed in two layers, the fibres of which cross each other at an angle af 45° (fig. 4 A, f, f, fig. 4 B, f).

As to the digestive canal, we must in all essential points coincide with Graber in respect of the histology; while we have retained Ehlers and Kefersteins division into œsophagus, the proper intestine and rectum. In the two sorts of Sipunculus, which have been described by us, and which are the only sorts hitherto known in the Scandinavian Fauna, the cæca-like bushy organs mentioned by Ehlers and Keferstein as situated in the vicinity of the Anal aperture, are not found, nor the "Wimperfurche" running along the interior surface of the intestine, in the Sipunculus nudus; but we find in the Sipunculus Norvegicus, immediately below the anus, on each side of the rectum, a small gland-shaped organ opening into the rectum; as likewise we have found in S. Norvegicus and priapuloides, and in some species of Phascolosoma, a small diverticle in the rectum filled with the ordinary contents of the intestine.

THE NERVOUS SYSTEM.

Besides what has been already previously mentioned, and what is known from the researches of Ehlers and Keferstein, we will point out that, in Osmium-preparations, the ventral cord and its branches are finely striated, without any granulated appearance, as is the case also in quite fresh living specimens of Onchnesoma Steenstrupii. There are indeed to be seen some fine granules on the ventral cord, as Keferstein states in reference to Sipunculus nudus; but these granules belong to the layer of cells which surrounds the nervous fibres. Only when the animal begins to die, the ventral cord and its branches become granulated.

In the Onchnesoma Steenstrupii, the ventral cord of which is in the proboscis extremely thin, and therefore may easily be examined in its whole substance without any special preparation, there are found, in the centre of the nervous cord, numerous groups of nervous cells along the whole proboscis (Tab. 15, fig. 35 a, a). Nothing similar could be noticed in other species. The finer ramifications of the nerves are, by reason of their extraordinary tenuity, extremely difficult to follow, even to short distances, in the Phascolosoma and Onchnesoma species; however we have traced them a little way; and so far they exhibit a similar ganglionated construction with radiating branches (fig. 35 g), which we will now notice in reference to the Sipunculus. In young specimens of Sipunculus Norvegicus, treated with Osmium-acid and afterwards colored with

matoxylin, er det derimod lettere at demonstrere. De fra Bugstrengens primære Grene (Fig. 9 pn) udgaaende Traade ere meget talrige og danne en Mængde Anastomoser (Fig. 9 nt, nt, nt). Fra Hovedstammen (den primære Gren) udgaa regelmæssigt, i hvert Mellemrum imellem to Bundter af Længdemuskler, 2—3 Grene paa hver Side. Disse Grene anastomosere saavel indbyrdes, som med de Grene, der komme fra den oven- og nedenfor liggende Hoved-Stamme. Herved dannes paa Ringmusculaturen temmelig regelmæssige, paalangs anastomoserende Nervenet, der ligge i Længdemusklernes Mellemrum. I dette Net findes talrige ganglionære Knuder (Fig. 9 g, g, g), hvorfra udgaa Grene, dels til Ring- og Længdemusklerne (Fig. 9 f, f), dels gjennem Ringmuskellaget til Hudlegemerne (Fig. 9 n, n), og endelig findes Grene, der tabe sig paa eller i Epithelets Celler (Fig. 9 a).

Hæmatoxyline, it is however much more easy to demonstrate. The filaments, issuing from the primitive branches of the ventral cord (fig. 9 pn), are very numerous, and form a multitude of anastomoses (fig. 9 nt, nt, nt). From the main trunk (the primitive branch) there issue regularly in each interval between two fascicles of longitudinal muscles, 2—3 branches on each side. These branches anastomose with each other and with the branches that come from the main trunk situated above and below. Hereby there are formed, on the annular muscles, rather regular longitudinally anastomosing nerve-nets, which lie in the intervals of the longitudinal muscles. In these nets we find numerous ganglionic knots (fig. 9 g, g, g), from which there issue branches, partly to the annular and longitudinal muscles (fig. 9 f, f), partly through the layer of annular muscle to the cuticular bodies (fig. 9 n, n), and finally there are branches which accumulate on or in the cells of the epithelium (fig. 9 a).

KARSYSTEMET.

Dette har været Gjenstand for en Mængde Naturforskeres Undersøgelser, og om end Resultatet af disse i enkelte Punkter kan være noget afvigende, saa stemme dog Alle overens deri, at der ialmindelighed findes hos Sipunclerne to contractile Kar langs Spiserøret, hvilke foroven danne en Ringkanal, der corresponderer med Hulheden i Tentaklerne, imedens der hos Phascolosomaerne i Regelen kun findes et saadant contractilt Kar. Med Hensyn til dette Karsystems Function, saa have Meningerne været forskjellige. Nogle have antaget det for at staa i Aandedrættets Tjeneste, Andre i den almindelige Blodcirculations, imedens Brandt og med ham enkelte tidligere Forskere have ment, at det udelukkende tjener som mechanisk Kraft for Tentaklernes Udstrækning. De der antage, at Tentakularkarsystemet er et Respirations- og Circulationsapparat, formene, at der mellem dette og Kropshulheden maa være en umiddelbar Forbindelse, som de dog ingenlunde have paavist; de Andre paastaa, at ingen saadan Forbindelse existerer, og at følgelig Tentaklernes Kar med de contractile Kanaler udgjøre et for sig afsluttet System; og til denne Mening maa vi slutte os. Se vi hen til Slægten Petalostoma, der kun har to Tentakler, og til vore to nye Slægter Onchnesoma og Tylosoma, der aldeles ingen Tentakler have og heller ikke ere i Besiddelse af noget Karsystem; men at der ikkedestomindre hos disse Dyr, ligesaa godt som hos de øvrige Sipunculider med fuldt udviklet Tentakularsystem, foregaar et Slags Aandedræt, — saa forekommer det os, at det her omtalte Karsystem intet har med Respirationen at gjøre; men at det svarer, hvad allerede ældre Forskere have gjort opmærksom paa, til Holothuridernes Vandkarsystem. Hos vore to Sipunculus-Arter have vi i Huden iagttaget Længdekar, der i enkelte Henseender have noget tilfælles med de af Semper omtalte. Disse Hudkar dannes derved, at den Hinde, vi have kaldt Peritoneum, gjør Udkrængninger, som trænge ind imellem Muskelhuden og Epithellaget i Form af runde Kar, der fortil,

THE VASCULAR SYSTEM.

This has been the subject of the investigations of a number of natural historians; and even if the result of these researches may be in some points a little divergent, yet they all agree in shewing that there are generally in the Sipunculi two contractile vessels along the oesophagus, forming above an annular canal which corresponds with the cavity in the tentacles; while in the Phascolosomas there is usually only one such contractile vessel. With respect to the function of this vascular system, opinions have been divided. Some have regarded it as standing in the service of the respiration; others, in that of the general blood-circulation; while Brandt, and with him a few of the earlier naturalists, have been of opinion that it serves exclusively as a mechanical power for the extension of the tentacles. Those who assume that the tentacular-vascular system is an apparatus of respiration and circulation, hold that there must be between it and the perivisceral cavity a direct connexion, which however they have in no wise demonstrated; the others maintain that no such connexion exists, and that consequently the vessels of the tentacles with the contractile canals form a complete system for themselves; and we must coincide with this opinion. If we look to the genus Petalostoma, which only has two tentacles, and to our two new genera Onchnesoma and Tylosoma, which have no tentacles at all, nor possess any vascular system, and consider that in these animals, as well as in the other Sipunculidæ with a fully developed tentacular system, a sort of respiration does take place, it appears to us that the vascular system here noticed has nothing to do with the respiration, but that it answers, as earlier naturalists have already remarked, to the water-vessel system of the Holothuridæ. In our two species of Sipunculus we have observed in the skin longitudinal vessels, which in certain respects have something in common with those mentioned by Semper. These cuticular vessels are formed by the membrane, which we have called peritoneum, in-

hvor Snabelen, og bagtil, hvor Glans tager sin Begyndelse, — ende blindt, uden at forgrene sig (Fig. 10 k, k). De adskille sig saaledes væsentlig fra Sempers Hudkar derved, at de ingen Forgreninger eller Anastomoser danne, og heller ikke staa i Forbindelse med Tentakularsystemet. Tager man et Stykke Hud af Sipunculus priapuloides og betragter det fra Indsiden under Mikroskopet, saa er Præparatet tyndt og gjennemsigtigt nok til at undersøge de forskjellige Lag, endog med temmelig stærk Forstørrelse. Foruden Længde-, Skraa- og Ringmuskellaget med dets Spalter, sees paa Overfladen med Lethed Peritoneum, kjendeligt ved sin Musculatur (fig. 10 p, p). Og over de aflange Spalter i Ringmusculaturen findes aflange Huller i Peritoneum (Fig. 10 i, i, i, Fig. 4 A, i). Disse Huller ere Indgangene til Længdekarrene (Kefersteins Respirationskar?), hvis Conturer ved dybere Indstilling kan skimtes under Ringmusklerne. End bedre ser man Længdekarrene, naar Cuticula præpareres af, og man betragter Præparatet fra den udvendige Flade. Saavel paa et saadant Præparat, som paa Tversnit af Huden parallelt med Ringmusklerne (Fig. 5 rk), findes Karrene liggende udenpaa Ringmusklerne, svarende til Rummene mellem Længdemusklerne. Og endelig kan man paa Tversnit parallelt med Længdemusklerne (Fig. 6) se den directe Sammenhæng imellem Peritonealhulheden (Fig. 6 b) og Længdekarret. Længdekarrenes Vægge (Fig. 4 B) vise ogsaa den samme Bygning som Peritoneum (Fig. 4 A, p, p), ligesom deres indre Flade er forsynet med Cilier paa lignende Maade som Peritoneum. Nogen Forbindelse mellem disse Hudkar og Tentakularsystemet finder ikke Sted, og hos Slægterne Phascolosoma, Onchnesoma og Tylosoma fandtes, saavidt vore Undersøgelser gik, ingen Hudkar. Indholdet af Hudens Længdekar er det samme, som findes i Kropshulheden. Dette Indhold har indtil de allersidste Tider været nøiagtigt undersøgt, og iblandt de Legemer, som findes deri, have de af Krohn, Ehlers, Keferstein, Brandt med Flere beskrevne saakaldte „Tøpfchen" tiltrukket sig en særlig Opmærksomhed. Enkelte Forskere have antaget dem for parasitiske Legemer, medens Andre antage dem for at være bestemte, for Sipunculiderne eiendommelige Organer. E. Ray-Lankester [1]) har for ganske nylig paavist, at disse „Tøpfchen" udvikle sig paa de contractile Kar, der ere fæstede til Spiserøret, og senere løsrive sig for at svømme frit i Kropshulhedens Vædske, — og mener at kunne bevise deraf, at disse Legemer ere Organer, der tilhøre Sipunculiderne, og ikke Parasiter. Vore Iagttagelser give os ikke nogen Anledning til at afgjøre Noget med Hensyn til disse Legemer; kun have vi seet, at de ere meget sparsomt tilstede hos de Phascolosoma-Arter, vi have undersøgt. At Cilierne paa disse besynderlige „Tøpfchen" skulle være forsynede med en Knop, som Brandt beskriver dem, under Navnet „Ciliæ vibratoriæ capitatæ", have vi ikke kunnet stad-

[1]) The annals and magazin of nat. history XI Vol., 4 Ser., pag. 89.

truding itself between the muscular and the epithelial layer, in the form of round vessels, which in front, where the proboscis begins, and behind, where the glans begins, terminate blindly without ramification (fig. 10 k, k). They differ then essentially from Semper's cuticular vessels, by forming no ramifications nor anastomoses; neither do they stand in connexion with the tentacular system. If we take a piece of the skin of Sipunculus priapuloides, and examine it from the inner side under the microscope, the preparation is thin and transparent enough to admit of inspecting the different layers even with a rather strong magnifying power. Besides the longitudinal, oblique and annular muscle-stratum with its fissures, the peritoneum is easily perceived at the surface, and is recognisable by its muscular system (fig. 10 p, p). And above the oblong fissures in the annular muscle-stratum, there are oblong holes in the peritoneum (fig. 10 i, i, i, fig. 4 A, i). These holes are the entrances to the longitudinal vessels (Keferstein's respiratory vessels?) the outlines of which can be discerned under the annular muscles. The longitudinal vessels may be seen still better when the cuticle is dissected away, and the preparation viewed from the exterior surface. In such a preparation, as well as in a cross section of the skin parallel to the annular muscles (fig. 5 rk), the vessels are found lying outside of the annular muscles, corresponding to the spaces between the longitudinal muscles. And finally in a cross section parallel to the longitudinal muscles, (fig. 6), the direct connexion may be seen between the peritoneal cavity (fig. 6 b), and the longitudinal vessel. The walls of the longitudinal vessels (fig. 4 B) exhibit also the same structure as the peritoneum (fig. 4 A p, p), as also their interior surface is furnished with ciliæ in the same manner as the peritoneum. No connexion exists between these cuticular vessels and the tentacular system; and in the genera Phascolosoma, Onchnesoma and Tylosoma, so far as our researches went, there were no cuticular vessels to be found. The contents of the cuticular longitudinal vessels are the same as are found in the perivisceral cavity. These contents have, up to the most recent times, been minutely examined; and among the substances found there, the so-called „töpfchen", described by Krohn, Ehlers, Keferstein, Brandt and others, have attracted particular attention. Some naturalists have taken them to be parasitical bodies; while others have supposed them to be distinct organs peculiar to the Sipunculidæ. E. Ray-Lankester [1]) has quite lately demonstrated that these „töpfchen" develop themselves on the contractile vessels which are attached to the oesophagus, and afterwards detach themselves so as to swim freely in the liquid of the perivisceral cavity; and he is of opinion, that hence these bodies may be proved to be organs belonging to the Sipunculidæ and not para-

[1]) The annals and magazine of nat. history XI vol., 4 ser., pag. 89.

fæste; men maa være enige med R. Lankester deri, at disse Knopper formentlig ere frembragte ved Kunst.

De saakaldte Segmentalorganer — brune Blærer, brune Rør. — Hos Sipunculiderne findes som bekjendt, ialmindelighed to, men hos enkelte Arter kun et, dels blæreformigt, dels rørformigt Organ, der ved sin bredere Del er fæstet til Bugfladen, medens den smalere Ende hænger frit i Kropshulheden. Disse Organer aabne sig udad paa Bugfladen, hvorom Alle ere enige, medens de ifølge enkelte Forskere skulle have en Pore paa den frie Ende, og efter Andre f. Ex. Semper og Jourdain en tragtformig Aabning nær Befæstningsstedet. De have en noget forskjellig Farve, dels brun, gul, orangegul, dels næsten vandklar f. Ex. hos Sipunculus norvegicus, hvilken Farve væsentligen afhænger af deres Indhold, hvori stundom findes fine Sandkorn. De ere stærkt musculøse, og paa deres indvendige Flade beklædte med et cilierende Epithel. Vi staa her atter over for Organer, om hvis Function der har hersket og fremdeles hersker megen Tvivl. De have været antagne snart for Testikler, snart for Æggestokke, alt eftersom man har fundet Spermatozoer eller Æg i dem, snart ere de blevne anseede for Respirationsorganer, snart for Secretionsorganer, og endelig for Oviducter, lig Segmentalorganerne hos Anneliderne, hvilken sidste Antagelse fik en stærk Støtte i Sempers Iagttagelser paa flere tropiske Sipuncler, hos hvilke han skal have seet Æggene passere fra Kropshulheden ind igjennem den af ham beskrevne traktformige Aabning for at komme ind i de nævnte Organer, og der end mere udvikles. — Paa de Exemplarer, vi have undersøgt, saavel af Slægten Sipunculus som Slægterne Phascolosoma og Onchnesoma, har det ikke været os muligt at opdage nogensomhelst anden Aabning for disse Organer end den, der findes paa den udvendige Bugflade, og som er forsynet med en liden Sphincter. Det har rigtignok stundom seet ud som om der var en Aabning paa den frit i Kropshulheden svømmende Ende; men det har ved streng Undersøgelse vist sig at være en Grube, der faar en skuffende Lighed med en Porus, som fremkaldes ved Muskelcontractioner, og som hyppig opstaar og forsvinder igjen. Heller ikke Brandt har været istand til at opdage nogen Aabning, hverken paa den fri bagerste eller paa den forreste Ende, og det uagtet han har gjort flere Injectioner. Flere Naturforskere have imidlertid iagttaget dels Æg, dels Spermatozoer i større og mindre Mængde indeni disse Organer, hvilket vi aldrig have seet, — og forsaavidt Æggene og Zoospermerne ikke dannes der, har Spørgsmaalet været, hvorledes de skulde være komne ind, naar ingen Aabning existerer, hvorigjennem de kunde passere. Vi kunne intet tilfredsstillende Svar give herpaa; men det forekommer

sites. Our researches give us no opportunity for deciding anything with respect to these bodies; only we have seen that they are present in very small numbers, in the species of Phascolosoma which we have examined. That the ciliæ on these remarkable „töpfchen“ should be furnished with a knob, as Brandt describes them to be, under the name „ciliæ vibratoriæ capitatæ“, we have not been able to ascertain; but we must agree with Lankester, that their knobs are probably produced artificially.

The so-called segmental organs – brown vesicles, brown canals — are, as is well known, found generally two in number in the Sipunculidæ; but in some species there is only one partly visicular, partly tubular organ, which at its broader part is attached to the ventral surface, while the narrower extremity is suspended freely in the perivisceral cavity. These organs have their opening outwards on the ventral surface, as to which all are agreed; while, according to some naturalists, they are said to have a pore at the free extremity, and according to others, for instance Semper and Jourdain, a funnel-shaped aperture near the point of attachment. They have a very different colour, sometimes brown, yellow, orange yellow, and sometimes nearly pellucid, as for instance in the Sipunculus norvegicus, the colour depending chiefly on their contents, among which there are sometimes found fine grains of sand. They are strongly muscular, and on their interior surface covered with a ciliating epithelium. We have here again before us organs, as to the functions of which there has existed, and still exists, much doubt. They have been regarded sometimes as testicles, sometimes as ovaries, accordingly as spermatozoa or ova have been found in them; sometimes they have been taken for organs of respiration, for organs of secretion, and finally for oviducts, like the segmental organs in the annelides, which last assumption was strongly supported by Semper's observations on several tropical Sipunculi, in which it is said that he saw the ova pass from the perivisceral cavity through the funnel-shaped opening described by him, in order to enter the organs in question and there to be further developed. In the specimens we have examined, as well of the genus Sipunculus as of the genera Phascolosoma and Onchnesoma, it has not been possible for us to discover any other opening whatever for these organs, excepting that which exists in the exterior ventral surface, and which is furnished with a small sphincter. There has indeed sometimes appeared to be an aperture at the extremity which swims freely in the perivisceral cavity; but on strict examination, this apparent aperture has always proved to be a hollow, with a deceptive resemblance to a pore, produced by muscular contraction, and frequently disappearing and recurring. Neither has Brandt been able to discover any aperture on the free posterior extremity nor on the anterior extremity; and that notwithstanding he has made several injections. Several naturalists have however observed somtimes ova, and sometimes spermatozoa in greater or smaller numbers inside of these or-

os, at Brandts Conjectur er rimelig, nemlig at Æggene og Zoospermerne, efterat være komne ud af Kropshulheden, og svømme frit i Søen, kunne tilfældigvis trænge ind igjennem de omtalte Organers Aabning, der findes paa Bugfladen, ligesaa godt som man finder fin Sand trængt ind i dem paa den Vei. At antage dem for Generationsorganer kunne vi ikke; thi foruden at deres Bygning taler derimod, have vi ingensinde seet hverken modne eller umodne Æg eller Spermatozoer i dem, og det uagtet vi jævnlig have truffet paa Æg i Kropshulheden. Vi skulle senere omtale Kjønsorganerne og da paavise deres Sæde. Vi have hos enkelte, næsten vandklare Sipunculider kunnet iagttage, hvorledes disse blæreformige Organer have været fyldte med en saagodtsom farvefri Vædske, hvorledes de under Contractionerne have udtømt denne, idet Lumenet i høi Grad er formindsket, og hvorledes efter nogen Tid Blærerne atter ere blevne udspændte. Dette i Forbindelse med deres Bygning og deres Udførselsaabning, der er forsynet med en liden Sphincter, giver os Grund til at antage dem for Afsondringsorganer, — og som saadanne maa vi nærmest henføre dem til et Slags Urnyrer. Brandt med Flere ere ogsaa komne til en lignende Antagelse, nemlig at de ere Excretionsorganer.

GENERATIONSORGANERNE.

Hos vore to Sipunculus-Arter have vi ikke stødt paa noget Organ, der kunde lede os til at tro, at deri udviklede sig Æg eller Spermatozoer; heller ikke have vi hos dem fundet Kjønsproducter frit i Kropshulheden eller paa noget andet Sted i Legemet. Vore Undersøgelser ere jævnligen anstillede Midtsommer, og det tør hænde, at just paa den Tid ere Generationsorganerne ikke udviklede hos vore bekjendte Sipuncler. Anderledes forholder det sig med de Phascolosomaer, vi have undersøgt; hos de fleste af dem have vi ikke alene fundet Æg svømmende frit i Kropshulheden; men vi have ogsaa fundet det Organ, hvori de udvikles. Hos Phascolosoma squamatum, abyssorum, Lovénii, margaritaceum, eremita, vulgare, dannes Æggestokken af to bladformige Membraner i Form af Blindsække, der paa den indvendige Flade ere beklædte med et Kjerne-Epithel. Den tager sit Udspring fra den Del af Peritoneum, der beklæder den nederste Del af Spiserøret, et lidet Stykke ovenfor Tarmspiralens Begyndelse. Naar Æggestokken er fuldt udviklet, omgiver den Spiserørets nederste Del, samt Tarmspiralens øverste, medens dennes nederste Del ikke fuldkommen indkapsles, idet nemlig Æggestokken her har en Spalte, hvorved Tarmspiralen bliver synbar. Æggestokken er i sin Bygning temmelig simpel; den omtalte Membran danner en hel Del Indkrængninger, dels som

gans, which we never have seen, and forasmuch as ova and zoospermata are not formed there, the question has been how they could have come in, where no opening exists through which they could pass. We can give no satisfactory answer to this; but it appears to us, that Brandt's conjecture is reasonable, namely that the ova and zoospermata, after having issued out of the perivisceral cavity, and after swimming freely in the sea, may be able to penetrate into these organs accidentally through the aperture which exists in the ventral surface, just as well as fine sand is found introduced into them in that way. To regard them as organs of generation is impossible for us; for besides their structure opposing this notion, we have never seen mature or immature ova or spermatozoa in them; and that notwithstanding we have constantly met with ova in the perivisceral cavity. We shall subsequently notice the sexual organs, and then indicate their situation. We have been able in some nearly pellucid Sipunculides, to observe how these vesicular organs have been filled with a nearly colorless fluid; how they have expelled it during the contractions, while the lumen has been diminished in a great degree, and how after some time the bladders have been again inflated. This, in connexion with their structure and their excretory orifice, which is provided with a small sphincter, gives us cause to presume that they are organs of secretion, — and as such we must rather consider them to be a sort of primitive kidneys. Brandt and several others have also come to a similar conclusion, namely that they are organs of excretion.

THE ORGANS OF GENERATION.

In our two species of Sipunculus, we have not met with any organ which could lead us to believe that ova or spermatozoa were there developed; neither have we in these species found sexual products free in the perivisceral cavity nor in any other part of the body. Our investigations were constantly made in the middle of the summer; and it may be that just at that season the organs of generation are not developed in our known Sipunculi. But the case is quite different with the Phascolosomas we have examined. In most of these we have not only found ova floating freely in the perivisceral cavity; but we have also found the organ where they are developed. In the Phascolosoma squamatum, abyssorum, Lovénii, margaritaceum, eremita, vulgare, the ovary is formed by two leaf-like membranes in the shape of cæca, of which the interior surface is covered with a nucleal epithelium. It takes its issue from that part of the peritoneum which covers the lower part of the oesophagus, a little way above the commencement of the spiral of the intestine. When the ovary is fully developed, it surrounds the lower part of the oesophagus and the upper part of the spiral of the intestine; while the lower part of the spiral is not completely incapsulated; the ovary having here a fissure through which the spiral of the intestine is visible. The ovary is in its structure

Blærer, dels som smalere Blindsække, hvilke alle ere beklædte med et Epithel, der er forsynet med temmelig store Kjerner. Indeni disse Blærer og Blindsække have vi fundet Æg i alle Udviklingsstadier. Efterhaanden som Æggene modnes, udspændes den tynde Membran, bliver alt tyndere og tyndere, indtil den brister, og da sees Æggene i store Masser dels mellem Tarmslyngningerne, dels i Kropshulheden. Naar Æggene paa denne Maade ere frigjorte, sees kun enkelte membranøse Fnug at hænge paa Spiserøret og Tarmspiralen som de sidste Rester, der ere tilbage af Æggestokken. Undersøges disse Rester under Mikroskopet, vise de sig at bestaa af meget udvidede Blærer eller Blindsække, der ere beklædte med det tidligere omtalte Epithel; men forøvrigt ere de ganske tomme. Medens Æggene fortsætte sin Udvikling i Kropshulheden, forsvinde ogsaa de sidste Rester af Æggestokken ganske, saa der intet Spor bliver tilbage af den. Saaledes er den almindelige Gang; men da Membranen og dens Blindsække, der danne Æggestokken, ere overordentlig fine, hænder det hyppigt, at under Dyrets Sammentrækninger og Tarmspiralens Bevægelse løsrive større og mindre Stykker af Æggestokken sig, hvilke kunne indeholde mere og mindre udviklede Æg, der da komme til at flyde om i Kropshulhedens Vædske, hvor de senere udvikles. Nogen Aabning, hvorigjennem Æggene kunne passere udaf Kropshulheden, have vi ikke iagttaget, og vi ere heller ikke tilbøielige til at tro, at der gives nogen saadan hos de Arter, der af os ere blevne undersøgte. Derimod have vi ofte seet, at paa Kroppens bagerste Ende dannes der snart en Grube, snart en conisk Fremstaaenhed, alt eftersom denne Del af Dyret sammentrækker eller udvider sig, og medens Gruben under Sammentrækningerne er bleven dybere og dybere, er den coniske Fremstaaenhed under Udvidningerne bleven større, meget tyndere og næsten gjennemsigtig, uden at vi dog have iagttaget nogen Ruptur. Imidlertid ere vi tilbøielige til at tro, at naar Æggene ere fuldmodne, brister denne tynde coniske Fremstaaenhed for at lade Æggene blive frie, — en Antagelse, der forresten stemmer overens med enkelte andre Forskeres Mening om Æggenes Frigjørelse. Sammenholde vi nu disse vore Iagttagelser med de, der af tidligere Forskere ere anstillede med Hensyn til Generationsorganerne, saa mene vi, at de mange Uoverensstemmelser, som virkelig finde Sted, væsentlig grunde sig paa, at neppe Nogen før har seet den virkelige Æggestok, men enten kun løsrevne Stykker af den eller frigjorte Æg, der svømme om i Kropsvædsken. Imidlertid er der en Iagttagelse af Claparède, anstillet paa to nye Phascolosomaer ved den skotske Kyst, hvilken synes at tyde hen paa, at han virkelig har seet en Æggestok, dannet paa lignende Maade, som den af os beskrevne. Han siger nemlig [1]): „Die Eier bilden sich in einem doppelten flachen Organ (Fig. 8 o), das zwischen den Darmwindungen unweit vom After liegt. Es wird dasselbe sowohl am

[1]) J. Müllers Archiv für Anatom. Physiolog. 1861, pag 541, Taf. 12, Fig. 1 o.

rather simple: the membrane noticed forms a number of folds, partly as bladders and partly as smaller cæca, which are all covered with an epithelium that has rather large nuclei. Inside of these vesicles and cæca, we have found ova in all stages of development. Gradually as the ova become mature, the thin membrane is stretched, becoming thinner and thinner until it bursts; and then the ova are seen in large masses, partly between the convolutions of the intestine, partly in the perivisceral cavity. When the ova are in this manner liberated, only some few membraneous shreds are seen, adhering to the oesophagus and the spiral of the intestine, as the last vestiges remaining of the ovary. When these remnants are examined under the microscope, they are found to consist of highly expanded vesicles or cæca, which are covered with the epithelium previously noticed; but they are otherwise quite empty. While the ova continue their development in the perivisceral cavity, the last vestiges of the ovary disappear entirely; so that no trace of it remains. This is the usual course; but as the membrane and its cæca, which form the ovary, are extremely fine, it often happens that, in the contractions of the animal, and in the movement of the spiral of the intestine, larger or smaller pieces of the ovary become detached; and these may contain more or less developed ova, which thus come to float about in the liquid of the perivisceral cavity, wherein they are subsequently developed. We have not observed any opening through which the ova could pass out of the perivisceral cavity, neither are we inclined to think that any such aperture exists in the species which have been examined by us. But we have often seen, that there is formed, on the posterior extremity of the body, sometimes a hollow, sometimes a conical prominence, accordingly as this part of the animal is contracted or expanded; and while the hollow becomes during the contractions deeper and deeper, the conical prominence becomes during the expansions larger, much thinner and nearly transparent; although we have never observed any rupture. We are however disposed to think that, when the ova are fully mature, this thin conical prominence bursts, in order to let the ova become free, — a notion which moreover agrees with the opinion of some other naturalists as to the liberation of the ova. If we compare these our observations with those made by earlier naturalists in regard to the organs of generation, we think that the many discrepancies which really exist, are owing chiefly to no one having seen the real ovary, but only detached pieces of it, or liberated ova, floating in the perivisceral liquid. However there is one observation of Claparède, made on two new Phascolosomas on the Scotch coast, which seems to indicate that he has really seen an ovary formed in a similar manner to that described by us. He says namely [1]): „Die Eier bilden sich in einem doppelten flachen Organ (fig. 8 o) das

[1]) J. Müllers Archiv für Anatom. Physiolog. 1861, p. 541, Taf. 12, fig. 1 o.

Darme, wie auch — so schien es mir — an der Leibeswand, durch ein mit zahlreichen Zellkernen besprenkeltes Mesovarium befestigt. Die kleinen Eier fallen, wahrscheinlich durch einfaches Ablösen vom Eierstock, in die Leibeshöhle, wo sie allmählig bis zu einer ansehnlichen Grösse anwachsen".

Nogle Aar senere synes det, som om Claparède ganske ignorerer denne sin Iagttagelse, idet han i sine Undersøgelser ved den franske Kyst[1]) udtaler sig med Hensyn til Slægtsorganerne hos Sipunculiderne saaledes: „Vergebens suchte ich an der flimmernden Leibeswand nach Drüsen, von welchen die Zellen hätten abstammen können. Nirgends waren sie zu finden. Dagegen schwammen in der Leibesflüssigkeit mehrere undeutlich zellige, breite Klumpen (Fig. 23), an deren Oberfläche ganz ähnliche Zellen hafteten. Ich halte sie für schwimmende Hoden. Bei den Weibchen entstehen übrigens die Eier ganz auf dieselbe Weise, nämlich aus schwimmenden Zellengruppen". Ser man hen til de Meninger, der have gjort sig gjældende med Hensyn til de Steder, hvor Æggene skulle opstaa, saa ville vi finde, at de dele sig i to Grupper, — den ene, der antager, at Æggene dannes i Kropshulheden, den anden, at de dannes i Huden. Til den første Gruppe henhøre Krohn, Grube, Brandt m. Flere, — til den sidste Meyer, Ehlers og Keferstein. Uden at have paavist noget bestemt Organ i Kropshulheden, antages det, at Æggene dannes i svømmende Æggestokke i Kropsvædsken, idet de have fundet Cellegrupper, der have indeholdt Æg i forskjellige Udviklingsstadier. Hvad nu disse svømmende Æggestokke betræffer, saa have jo vi ogsaa fundet disse Cellegrupper med Æg i; men vi have samtidigt kunnet overbevise os om, at de ikke have været Andet eller Mere, end løsrevne Stykker fra den egentlige Æggestok. De have nemlig havt samme Bygning og samme Indhold som denne, — og selv skilte fra sit Moderorgan, have de dog været istand til at udvikle de deri indesluttede Æg. Den anden Mening, at Æggene skulle udvikle sig i Huden i særegne Rum, er først omtalt af Meyer, Ehlers og Keferstein; denne sidste har dog senere frafaldt den. Vi finde det meget rimeligt, at man hos Sipunclerne har fundet Æg leirede i Huden; thi efter de Undersøgelser, vi have anstillet over Huden, saavel hos Sipunclerne, som hos Phascolosomerne, have vi kunnet paavise, at hos Sipunclerne er der i Huden Længdekanaler, der gjennem Aabninger i Peritoneum correspondere med Kropshulheden; og under Dyrets Sammentrækninger ville jo de i Kropsvædsken indeholdte Æg med Lethed kunne jages ind i disse Kanaler (Kar), og der ophobes. Men da der i Huden hos Phascolosomerne ingen saadanne Hudkar findes, har heller Ingen fundet Æg i deres Hud. Hvad vi have sagt om Æggestokken, gjælder i det Væsentlige ogsaa for Testikkelens Vedkommende. Vi have paa et Spiritusexemplar fundet et Æggestokken fuldkommen lignende

[1]) Claparède. Beobachtungen über Anatomie und Entwicklungsgeschichte wirbelloser Thiere. 1863, pag. 62.

zwischen den Darmwindungen unweit vom After liegt. Es wird dasselbe sowohl am Darme, wie auch — so schienes mir — an der Leibeswand, durch ein mit zahlreichen Zellkernen besprenkeltes Mesovarium befestigt. Die kleinen Eier fallen wahrscheinlich durch einfaches Ablösen vom Eierstock in die Leibeshöhle, wo sie allmählig bis zu einer ansehnlichen Grösse anwachsen".

Some years afterwards, it seems as if Claparède entirely ignores this his observation; as in his researches on the French coast[1]), he expresses himself with respect to the sexual organs in the Sipunculides thus: „Vergebens suchte ich an der flimmernden Leibeswand nach Drüsen, von welchen die Zellen hätten abstammen können. Nirgends waren sie zu finden. Dagegen schwammen in der Leibesflüssigkeit mehrere undeutlich zellige, breite Klumpen (fig. 23), an deren Oberfläche ganz ähnliche Zellen hafteten. Ich halte sie für schwimmende Hoden. Bei den Weibchen entstehen übrigens die Eier ganz auf dieselbe Weise, nämlich aus schwimmenden Zellengruppen". If we regard the opinions which have prevailed with respect to the places where the ova are said to originate, we shall find that they divide themselves into two groups; one in which it is assumed that the ova are formed in the perivisceral cavity; the other, that they are formed in the skin. To the first group we may refer the opinions of Krohn, Grube, Brandt, and others; to the latter, those of Meyer, Ehlers and Keferstein. Without having indicated any definite organ in the perivisceral cavity, it is supposed that the ova are formed in floating ovaries in the fluid of the body; as groups of cells therein have been found to contain ova in various stages of development. Now as regards these floating ovaries, we have also found these groups of cells with ova in them; but we have at the same time been able to convince ourselves that they were nothing else and nothing more than detached pieces from the proper ovary. They have the same structure and the same contents as the ovary — and even when separated from the mother organ, they have yet been able to develop the ova contained in them. The other opinion that the ova develop themselves in the skin in special places, was first noticed by Meyer, Ehlers and Keferstein; the latter has however subsequently abandoned it. We find it very probable that ova have been discovered in the Sipunculi, imbedded in the skin; for according to the examinations we have made of the skin, as well in the Sipunculi as in the Phascolosomas, we have been able to demonstrate that there are in the skin of the Sipunculi longitudinal canals which correspond through openings in the peritoneum with the perivisceral cavity; and during the contractions of the animal, the ova contained in the perivisceral cavity may easily be driven into these canals (vessels) and accumulate there. But as in the skin of the Phascolosoma, there are no such cuticular vessels, so neither has any one found ova

[1]) Claparède. Beobachtungen über Anatomie und Entwicklungsgeschichte wirbelloser Thiere. 1863, p. 62.

Organ, men som istedetfor at indeholde Æg, var udfyldt med en utallig Mængde traadformige Legemer, som vi ikke kunde faa til Andet end Zoospermer; forøvrigt var Bygningen den samme, som vi have omtalt ved Æggestokken. At Hannerne hos Sipunculiderne maa være temmelig sjeldne i Forhold til Hunnerne, have vi Grund til at tro deraf, at blandt de mangfoldige Phascolosomaer, vi have undersøgt, have vi kun paa 1 Spiritusexemplar, og 1 levende fundet Zoospermer, hvilket stemmer overens med Claparède's Iagttagelser.

Til Slutning skulle vi omtale to Organer, som vi constant have fundet ved Grunden af Bugretractorerne (et ved hver Retractor) hos Phascolosomerne, og som vi have beskreve ved hver enkelt Art (se den specielle Beskrivelse over Phascolos.). Disse Organer, der ere traadformige, bugtede Legemer, som omgive Retractorens Basaldel, have indeni sig en Kanal, hvori vi nogle Gange have fundet Æg i forskjellige Udviklingsstadier, medens vi oftere have fundet dem uden Æg. Allerede for flere Aar siden tiltrak disse Organer sig vor Opmærksomhed, og forunderligt nok har, saavidt os bekjendt, ingen af de Forskere, der have beskjæftiget sig med Sipunculiderne, omtalt dem, førend vi nu for ganske nylig finde i en liden Notits af Hubert Ludwig i hans Arbeide over Ægdannelsen i Dyreriget [1]), at Semper skal have iagttaget disse Organer, og fremsat den Formodning, at de muligens vare Genitalkjertler.

SIPUNCULIDÆ.

SIPUNCULUS NORVEGICUS, Nobis.

(Tab. 13, fig. 7—10).

Sipunculus norvegicus, D. Forhandlinger ved de skandinaviske Naturforskeres Møde i Christiania 1868, pag 541.

Legemet cylindrisk, 60 Mm. langt og 20 Mm. i Omkreds, svagt ribbet paa langs og fint stribet paatvers. Henimod den bagerste Del danner Huden en fremragende Fold, der gaar som en Vold omkring Legemet, hvorved opstaar en tydelig Glans, der er 9 Mm. lang (Tab. 13, fig. 7). Dennes bagerste Ende er afrundet, og har paa Midten en yderst fin Grube, hvori dog ingen Aabning er. Foran Volden er Kroppen noget smalere, men udvider sig fortil imod Snabelen, hvor den atter bliver smalere. Fra Volden til Snabelens Begyndelse har Kroppen en Længde af 35 Mm. Snabelen er omtr. 16 Mm. lang, tæt besat med coniske Papiller, der staa i uregelmæssige Rækker, som tiltage i Tæthed imod dens Ende. Mundaabningen danner en Tverspalte, og er omgiven af 8 temmelig tykke hvidgule Tentakler, der ere næsten lancetformige med afstumpede Ender og nedentil sparsomt lappede.

[1]) Arbeiten aus dem zoolog.-zootom.-Institut in Würzburg. Semper 1874, p. 338.

in the skin of these. What we have said of the ovary applies in the main also to the testicle. We have in a spirit specimen found an organ completely resembling an ovary, but, instead of containing ova, filled with innumerable filiform bodies which we could not make out to be any thing else than zoospermata. Otherwise the structure of the organ was the same as we have noticed in the ovary. That the males in the Sipunculi must be rather rare in proportion to the females, we have some reason to believe; as among the numerous Phascolosomas we have examined, we have only in one spirit specimen and in one living specimen found zoospermata; which agrees with the observations of Claparède.

In conclusion we shall notice two organs which we have constantly found at the base of the ventral retractors (one at each retractor) in the Phascolosoma, and which we have described in each single species (see the special description of Phascolos.). These organs, which are filiform, sinuous bodies surrounding the basal part of the retractor, have in them a canal wherein we have sometimes found ova in different stages of development, while we have more frequently found them without ova. Already several years ago these organs attracted our attention; and strange enough, so far as we know, not any of the naturalists who have turned their attention to the Sipunculides have mentioned them, until we find quite recently, in a little notice by Hubert Ludwig in his work on the formation of ova in the animal Kingdom [1]), that Semper is said to have observed these organs, and to have put forth the supposition that they are possibly genital glands.

SIPUNCULIDÆ.

SIPUNCULUS NORVEGICUS, Nobis.

(Tab. 13, fig. 7—10).

Sipunculus norvegicus, D. Forhandlinger ved de skandinaviske Naturforskeres Møde i Christiania 1868, p. 541.

The body cylindrical, 60 Mm. long and 20 Mm. in circumference, slightly ribbed longitudinally and finely striped transversally. Towards the posterior part, the skin forms a prominent fold, which goes like a ridge round the body, whereby there is formed an evident glans 9 Mm. long (Tab. 13, fig. 7). The posterior end of this is rounded, and has in the middle an extremely fine hollow, wherein however there is no opening. In front of the ridge the body is somewhat smaller, but enlarges itself towards the anterior part to the proboscis, where it again becomes smaller. From the ridge to the commencement of the proboscis, the body has a length of 35 Mm. The proboscis is about 16 Mm. long, thickly covered with conical papillæ standing in irregular rows, which increase in density towards its extremity. The oral aperture forms a transverse fissure, and is surrounded

[1]) Arbeiten aus dem zoolog.-zootom.-Institut in Würzburg. Semper 1874, p. 338.

Huden er gjennemsigtig, fast, stærkt opaliserende. Analaabningen rund, og paa den forreste Trediedel af Kroppen. Muskellagene ere tre: Ringmusklerne (Fig. 10 r), de yderste, nærmest Huden, ere omtrent 100 i Antal; Længdemusklerne (Fig. 10 l), de inderste mod Kropshulheden ere 24, og Skraamusklerne (Fig. 10 s, s), der ligge imellem begge Lag. Ringmuskelbundterne have en Bredde af 0,4 Mm., slutte sig meget tæt sammen, og vige egentlig kun fra hinanden der, hvor de ikke overskjæres af Længdemusklerne. Paa Glans gaa de aldeles i hinanden. Længdemusklerne (Bundterne) have en Bredde af 0.3 Mm., og have lige bag til Glans et temmelig stort Mellemrum, nemlig 0.6 Mm. Idet de gaa over i Volden, slutte de sig tæt sammen, og imedens de yderste Fibre af hvert Bundt krydse hverandre og brede sig derefter udover Glans, løbe de midterste Fibre lige bagud, og blive alt sparsommere og sparsommere mod Enden. Skraamusklerne ere meget smale, 0.030 Mm., neppe flere end Halvparten saamange som Længdemusklerne, og bestaa af 4—6 Fibre; Bundternes Mellemrum udgjør 0.12—0.16 Mm. De enkelte Muskelfibre have en Tykkelse af 0.005 Mm., og deres Skeder ere forsynede med temmelig store Kjerner.

Retractorerne ere 4, som tage deres Udspring fra den indvendige Flade af Kropshulheden paa den forreste Del af dennes midterste Trediedel, ligesom parvis noget bagenfor Endetarmens Aabning, saa at to tilhøre Bugfladen, to Rygfladen. Retractorerne udspringe egentlig fra 4 Længdemuskler med 4 Rødder, og ere ved Udspringet temmelig brede, blive lidt smalere, men indtage snart sin tidligere Bredde, idet de convergerende gaa henimod deres Insertionssted, Tentakelringen.

Fordøielseskanalen dannes af en meget lang Tarm, der spiralformig slynger sig om sig selv. Den begynder ved Mundaabningen temmelig smal, løber saa i næsten lige Linie bag til Høiden af Analaabningen, nu tiltager den noget i Tykkelse, og gjør en svag Sidekrumning til Midten af Kropshulheden, hvor den danner en Slynge, stiger saa igjen fortil, danner atter en Slynge, for derefter at løbe i Bugtninger mod Enden af Kropshulheden. Her bøier den sig paany fortil, slyngende sig omkring den bagtil gaaende Tarmdel, indtil den kommer henimod den første Slynge, som den gaar over, derpaa løber den under den anden og forreste Slynge, bliver nu noget smalere (Rectum Fig. 8 re) og ender i Anus paa Dyrets Rygside. Tarmkanalen er i hele sin Længde fæstet med fine musculøse Traade, som tage deres Udspring fra Muskelhuden, til den indvendige Kropsvæg. Tarmen er indvendig beklædt med Cylinderepithel; nogen egentlig Ciliefure var ikke til at opdage. Omtrent 10 Mm. fra Analaabningen, just hvor Tarmen bliver smalere (Rectum) findes en næsten pæreformig Divertikel af 1 Mm. Længde. Denne

by 8 rather thick whitish yellow tentacles, which are nearly lancet-shaped, with obtuse extremities and below to some extent lobed. The skin is transparent, firm strongly opalised. The anal aperture is round and on the anterior third part of the body. The layers of muscles are three. The annular muscles (fig. 10 r), the outermost nearest the skin, about 100 in number; the longitudinal muscles(fig.10 l), the innermost nearest the perivisceral cavity, 24, and the oblique muscles (fig. 10 s, s), which are situated between both layers. The annular muscle-fascicles, have a width of 0.4 Mm., join very closely together, and properly speaking separate only from each other there, where they are not intersected by the longitudinal muscles. On the glans they go quite into each other. The longitudinal muscles (the fascicles) have a width of 0.3 Mm. and have just behind the glans a rather large interval, namely 0.6 Mm. As they go over into the ridge they join closely together; and, while the exterior fibres of each fascicle cross each other and extend themselves subsequently over the glans, the medial fibres run directly back and become more and more rare towards the extremity. The oblique muscles are very small, 0.030 Mm. scarcely more than half as numerous as the longitudinal muscles, and consist of 4—6 fibres. The intervals of the fascicles are 0.12—0.16 Mm. The simple muscular fibres have a thickness of 0.005 Mm. and their sheaths are furnished with rather large nuclei.

The retractors are 4 which take their origin from the interior surface of the perivisceral cavity, on the anterior portion of its middle third part, as also in pairs somewhat behind the aperture of the rectum; so that two belong to the ventral surface, and two to the dorsal surface. The retractors issue properly speaking from 4 longitudinal muscles with 4 roots, and are at their issue rather wide, becoming a little narrower, but soon recovering their former width, as they go converging towards their place of insertion, the tentacular ring.

The digestive canal is formed by a very long intestine winding spirally round itself. It begins, at the oral aperture, rather narrow, then runs in nearly a straight line back to the height of the anal aperture, increasing somewhat in thickness, and makes a slight bend to the middle of the perivisceral cavity, where it forms a loop; it then rises again forward, forms another loop, and then runs out in bends towards the end of the perivisceral cavity. Here it bends itself again forward, looping itself round the part of the intestine that goes in a backward direction, until it comes to the first loop which it goes over; then it runs under the second and foremost loop, becomes now somewhat narrower (rectum fig. 8 re) and terminates in the anus on the dorsal side of the animal. The intestinal canal is in the whole of its length attached by its muscular filaments, which take their issue from the muscular membrane to the interior wall of the body. The intestine is covered in the interior with cylinder-epithelium. No proper ciliary furrow could be discovered. About 10 Mm. from the anal aperture, just

lille Blindsæk aabner sig i Tarmen, og Indholdet var det samme som dennes, nemlig lerholdig Sand, hvori enkelte Rhizopoder fandtes. Et Stykke ovenfor Analaabningen udgaar fra en Længdemuskel en fin Muskeltraad (Spindelmuskel), der slaar sig over Rectum, fæster sig paa Divertikelen og gaar derfra ned imellem Tarmslyngningerne, hvor den forsvinder. De to knippeformige Blindsække, som findes paa Sipunculus nudus, ganske i Nærheden af anus, have vi ikke seet paa denne Art. Langs Spiserøret findes de to lange, contractile Kar, der tilhøre Tentakularsystemet.

To Segmentalorganer, der ere omtr. 8 Mm. lange, temmelig smale og meget contractile, hvorved de antage en forskjellig Form. Fyldte ere de saagodtsom vandklare; i contractil Tilstand blive de mindre gjennemsigtige.

Langs Dyrets Bugflade sees en temmelig tyk Nervestreng, som svulmer lidt kølleformigt op mod den bagerste Ende. Hvor Nervestrengen ligger tæt til Bugvæggen, afgiver den regelmæssigt et Par Grene til hver Ringmuskel; hvor den viger fra Bugvæggen for at stige mod Spiserøret, afgiver den mange tykke, lange, temmelig løstliggende Grene til dette (Fig. 8 nn), ligesom den, idet den løber imellem de to Retractorer, afgiver en Gren til hver. Hvor Nervestrengen begynder at forlade Bugvæggen, er den fæstet til denne ved en Muskel, der gaar fortil mod Tentakelkrandsen. Foruden til Ringmusklerne, sender Nervestrengen Grene til Huden. Saavel Kropshulheden, som de i den placerede Organer ere beklædte af Peritoneum.

Det i Kropshulheden indeholdte Fluidum er næsten vandklart, svagt rosenrødt, og deri findes de for Sipunclerne almindelige Celler og krukkeformige Legemer.

Sipunculus norvegicus er funden i Hardangerfjorden indtil 250 Favne og i Bergensfjorden paa 150 Favnes Dyb, blød, lidt sandholdig Lerbund. Den characteriseres saaledes:

Kroppen 44 Mm. lang, 20 Mm. i Omkreds, cylindrisk, vandklar, dens bagerste Del omgiven af en fremspringende Vold. Trende Muskellag, hvoraf det indre, Længdemusklerne 24, — det mellemste, Skraamusklerne 12, — og det yderste, Ringmusklerne omtrent 100. Snabelen kort, omtr. $^1/_4$ af Kroppens Længde, besat med coniske Papiller. Tentakelmembranen 8-fliget, lappet.

FORKLARING OVER FIGURERNE.

Tab. 13. Fig. 7. Sipunculus norvegicus, naturlig Størrelse.

Fig. 8. Samme forstørret; aabnet. *p* Snabelen; *s, s* Segmentalorganer; *n* den opsvulmede nederste Del af Nervestrengen; *nn* Nervegrene; *sp* Spindelmuskel; *d* Divertikel; *r, r* Retractorer; *re* Rectum; *m, m* Muskelstrenge til Tarmen; *lm* Længdemuskler; *ta* Tarmslyngningerne; *t* Tentakler.

where the intestine becomes smaller (rectum) there is an almost pear-shaped diverticle of 1 Mm. length. This little cæcum opens into the intestine and the contents are nearly the same, namely clayey sand, wherein a few Rhizopods have been found. A little way above the anal aperture, there issues, from a longitudinal muscle, a fine muscular fibre (the fusiform muscle) which extends over the rectum, attaching itself on the diverticle, and thence descends between the circumvolutions of the intestine, where it disappears. The two fascicular cæca, which are found in the Sipunculus nudus quite in the vicinity of the anus, we have not been able to discover in this species. Along the oesophagus there are two long contractile vessels, which belong to the tentacular system.

There are two segmental organs about 8 Mm. long, rather narrow and very contractile, whereby they acquire a different form. When full they are almost pellucid; but when in a contractile state, they are less transparent.

Along the ventral surface of the animal, there appears a rather thick nervous cord, which swells, a little club-like, towards the posterior extremity. Where the nervous cord lies close to the ventral surface, it throws out regularly a pair of branches to each annular muscle: where it recedes from the ventral surface, rising towards the oesophagus, it throws out many thick, long, rather loose-lying branches to the latter (fig. 8 nn); as also while it runs between the two retractors, it furnishes a branch to each. Where the nervous cord begins to leave the ventral surface, it is attached to the same by a muscle, which is fixed in the direction of the tentacular circlet. Besides sending branches to the annular muscles, the nervous cord sends out also branches to the skin. The perivisceral cavity, as well as the organs situated therein, are covered by the peritoneum.

The fluid contained in the perivisceral cavity is nearly pellucid, slightly rose-colored, and is composed of the usual cells and pot-shaped bodies common to the Sipunculi.

Sipunculus norvegicus has been found in the Hardangerfjord at a depth of 250 fathoms, and in the Bergensfjord in 150 fathoms, on soft rather sandy clay bottom; rare. It is thus characterised:

The body 44 Mm. long, 20 Mm. in circumference, cylindrical, pellucid; its posterior part surrounded by a prominent — ridge (annular projection). Three layers of muscles; the interior, longitudinal muscles 24, — the middle oblique muscles 12, — and the exterior, the annular muscles, about 100 in number. The proboscis short, about $^1/_4$ of the length of the body, covered with conical papillæ. The tentacular membrane lobed, 8 lobes.

EXPLANATION OF THE FIGURES.

Tab. 13, fig. 7. Sipunculus norvegicus natural size.

Fig. 8. The same magnified, opened. *p* the proboscis; *s, s* segmental organs; *n* the swollen lower part of the nervous cord; *nn* nerve branches; *sp* fusiform muscle; *d* diverticle; *r, r* retractor; *re* rectum; *m, m* muscular appendage to the intestine; *lm* longitudinal muscles; *ta* circumvolutions of the intestine; *t* tentacles.

Fig. 9. Et Stykke Hud af en ung Sipunculus norvegicus, 800 Gange forstørret (Osmiumsyre-Præparat, farvet med Hæmatoxylin). *pn* primær Gren fra Bugstrengen; *r* Ringmuskler; *a* Nervetraade tabende sig i Cuticularepithelet; *b & c* Hudlegemer med deres Nerver; *e* Muskelkjerner; *é* Muskelkjerne med tilsyneladende Nerve-Ende; *f, f* den sædvanlige Maade for Nervetraadens Udbredning i Musklerne; *g* Nerveganglier; *h* Epithelceller; *nt* Nervetraade.

Fig. 10. Hudstykke af Sipunculus norvegicus, seet indenfra, stærkt forstørret. *l* Længdemuskler; *r* Ringmuskler; *s, s, s* Skraamuskler; *p, p* Parietal-Peritoneum; *k, k* Kar; *i, i, i* Indgangsaabninger til Karrene.

SIPUNCULUS PRIAPULOIDES, Nobis.

(Tab. 13, Fig. 1—6.)

Kroppen cylindrisk, 115 Mm. lang, 55 Mm. i Omkreds, forsynet med 24 stærke Længderibber, der dog ophøre ved den bagerste Del (Fig. 1 lr), som gaar over i Glans. Denne, der er 30 Mm. lang, glat og ligner fuldstændig Glans paa det mandlige Membrum, danner foroven en temmelig stor, fritstaaende Vold, egentlig Hudfold, som omgiver hele Ryggen og Sidepartiet til henimod Bugfladen, hvor den paa hver Side forlænger sig convergerende bagtil omtr. 4 Mm. fra den afrundede Ende, hvorved fremkommer paa denne Del af Glans en Fure, der er bredest fortil. Voldens øverste Rand har et crenuleret Udseende, imedens dens Bugrande ere glatte. — Paa den afrundede Ende af Glans sees en liden rundagtig Fordybning, som under Sammentrækningerne antager forskjellige Former og faar stundomen skufende Lighed med en Aabning (Porus), hvoraf der dog ingen gives. Ved denne Fordybning fremkommer ligesom to Læber (Fig. 2 l), af hvilke den, der svarer til Rygsiden (Fig. 1 l), er mest fremragende; forøvrigt kan Glans trække sig stærkt sammen, og da antager den de forunderligste Former, men beholder altid sin Vold. Snabelen er omtrent $^1/_3$ saa lang som hele Dyret, forsynet med store, fremragende coniske Papiller, der danne Længderækker og blive mindre imod Mundaabningen. Tentakelmembranen danner 12 Flige, hvoraf to meget lange, en paa Ryg- og en paa Bugsiden; de øvrige ere kortere, men alle ere i Randen mere og mindre indskaarne. Analaabningen, der findes 22 Mm. fra Legemets forreste Ende, er aflang paatværs, stærk foldet, men bliver fuldkommen rund under Udførsel af Excrementer. Huden halvgjennemskinnende, aflang, gittret paa den egentlige Krop, imedens der paa Glans intet Gitter findes. Muskellagene ere trende; Ringmusklerne findes paa Kroppen fra Snabelens Begyndelse og til Glans i adskilte Bundter, der ved at overskjære Længdemusklerne danne Hudgitteret; men paa Snabelen og Glans lægge Bundterne sig sammen, saa de næsten danne en sammenhængende Muskelhud. Længdemusklerne ere 24, og træde frem i stærke Bundter, der ere fuldkommen adskilte over hele Legemet. Paa Snabelen slutter dog det ene Bundt sig til det andet; paa

Fig. 9. A piece of the skin of a young Sipunculus norvegicus, magnified 800 times. Osmium preparation colored with Hæmatoxyline. *pn* primary branches from the ventral cord; *r* annular muscles; *a* nervous filaments losing themselves in the cuticular epithelium; *b & c* cuticular corpuscles with their nerves; *é* muscular nuclei with extremities of corresponding nerves; *f, f* the usual manner in which the nervous filaments are distributed in the muscles; *g* the nervous ganglions; *h* epithelial cells; *nt* nervous filaments.

Fig. 10. Piece of the skin of Sipunculus norvegicus viewed from the inside, strongly magnified. *l* longitudinal muscles; *r* annular muscles; *s, s, s* oblique muscles; *p, p* parietal peritoneum; *k, k* vessels; *i, i, i* entrance apertures to the vessels.

SIPUNCULUS PRIAPULOIDES, Nobis.

(Tab. 13, fig. 1—6.)

The body cylindrical, 115 Mm. long, 55 Mm. in circumference, with 24 strong longitudinal ribs, which however terminate at the posterior part (fig. 1 lr) that goes over to the glans. The latter, which is 30 Mm. long, smooth and perfectly like the glans of the virile member, forms above a rather large, freely standing prominence; properly a fold in the skin surrounding the whole back and the side part, until near the ventral surface, where it is elongated on each side, converging backward with about 4 Mm. on the round end, whereby there is produced, on this part of the glans, a furrow which is widest in front. The superior margin of the prominence has an crenulated appearance, while the ventral margins are smooth. On the rounded end of the glans there appears a little roundish cavity, which during the contractions assumes various forms, and acquires sometimes a deceptive resemblance to an aperture (porus), which however does not exist. By this hollow, there are produced, as it were, two lips (fig. 2 l) of which one, corresponding to the dorsal side (fig. 1 l), projects most; moreover the glans can be strongly contracted; and then it assumes the most remarkable forms, always retaining, however, its annular prominence. The proboscis is about $^1/_3$ as long as the whole animal, furnished with large prominent conical papillæ, which form longitudinal rows and become smaller towards the oral aperture. The tentacular membrane forms 12 lobes, of which 2 are very long, one on the dorsal side, and one on the ventral side; the others are shorter; but all are more or less cut out at the edge. The anal aperture is 22 Mm. from the anterior extremity of the body; it is oblong transversely, strongly folded, but becomes perfectly round during the ejection of excrements. The skin is semi-transparent, oblong-latticed on the proper body; while on the glans there are no lattices. The layers of muscles are three; the annular muscles are found on the body, from the beginning of the proboscis to the glans, in separate fascicles, which, by intersecting the longitudinal muscles, form the cuticular-lattice. On the proboscis and on the glans, the fascicles lie close together, so as to form

Kroppen derimod vige Bundterne fra hverandre og danne der tydelige Mellemrum, der næsten ganske forsvinde, efter at Muskelbundterne ere gaaede over paa Glans. Her dele de sig i to, og udbrede sig nu som tynde Strenge lige til den bagerste Ende. Imellem disse tvende Muskellag findes det tredie, der danner Skraamuskler, som bestaa af smale Muskelstrenge, der staa meget langt fra hverandre, og udgjøre neppe mere end det halve Antal af Længdemusklernes. Kropshulheden og de i den indesluttede Organer ere beklædte med et Peritoneum, hvori findes Celler og spredte Muskelfibre. — 4 Retractorer, der hver tage sit Udspring fra 3 Længdemuskler, et lidet Stykke bagenfor Analaabningen, og løbe adskilte lige til Snabelens Ende, hvor de fæste sig omkring Tentakelmenbranens Grunddel. Fra en af Længdemusklerne udspringer den saakaldte Spindelmuskel med stærke Fibre, gaar over paa Endetarmen for senere som sædvanligt at løbe bagtil som Støtte for Tarmspiralen. Spiserøret, kort, cylindrisk, gaar noget til Høire over i Tarmen, der danner nogle S-formige Bøininger, førend den gaar over i den egentlige Tarmspiral. Denne ender i en temmelig lige Rectum, som udmunder paa Ryggen. Ved Analaabningen sees paa Endetarmen 2 smaa kjertelformige Organer, og strax nedenfor disse en liden Divertikel. Tarmslyngningerne, ligesom Rectum, ere ved mange Bindevævstraade fæstede til Kropshulheden. Langs Spiserøret findes paa hver Side et slangeformigt, contractilt Kar med sin frie Ende bagtil, medens det fortil er fæstet til Tentakelmembranen. Segmentalorganerne danne to langstrakte, gjennemsigtige Blærer, der ere meget contractile. Nervestrengen, der i den bagerste afrundede Kropsende danner en bulbøs Opsvulmen, gaar fortil, idet den udsender til begge Sider en Mængde Grene, og slaar sig til Slutning omkring Spiserøret for der at danne den sædvanlige Nervering.

Farven er gulhvid, perlemor-glindsende. Snabelen lidt mørkere. — Forekommer sjelden i Korsfjorden ved Bergen og i Søndfjord paa en Dybde af 100—150 Favne, leret Bund.

ARTSCHARACTEREN.

Kroppen cylindrisk med 24 stærke Længderibber. Snabelen omtr. $^1/_3$ af Kroppens Længde, forsynet med talrige, fremstaaende Papiller. Glans stærkt udpræget med en fri Vold, der omslutter Ryg og Sider, men som paa Midten af Bugfladen danner en Fure. 3 Muskellag: Ring-, Skraa- og Længdemuskler.

nearly a continuous muscular membrane. The longitudinal muscles are 24 in number, and appear in strong fascicles, which are completely separate over the whole body. On the proboscis however the one fascicle lies close to the other; but on the body, the fascicles recede from each other and form evident intervals, which disappear almost entirely after the muscular fascicles have gone over to the glans. Here they divide themselves in two, and extend now, as thin cords, even up to the posterior extremity. Between these two layers of muscles, there is the third, which forms oblique muscles consisting of narrow muscular cords standing very distant from each other, and scarcely half as numerous as the longitudinal muscles. The perivisceral cavity and the organs contained in it are covered with a peritoneum, wherein are found cells and dispersed muscular fibre. 4 Retractors, each of which issues from 3 longitudinal muscles, a little way behind the anal aperture, running separate even to the end of the proboscis, where they are attached round about the basal part of the tentacular membrane. From one of the longitudinal muscles, there issues the so-called fusiform muscle, with strong fibres going over to the rectum, and afterwards, as usual, running backwards as support for the intestinal spiral. The oesophagus, short cylindrical, goes somewhat to the right over into the intestine, which forms some *S*-shaped bends, before going over into the proper intestinal spiral. The latter terminates in a rather straight rectum, which has its orifice on the back. At the anal aperture there appear on the rectum 2 small gland-shaped organs, and immediately below these a little diverticle. The circumvolutions of the intestine, as also the rectum, are attached, by many filaments of connecting tissue, to the perivisceral cavity. Along the oesophagus, there is on each side a serpentine, contractile vessel, with a free posterior extremity; while the anterior extremity is attached to the tentacular membrane. The segmental organs form two elongated transparent vesicles, which are very contractile. The nervous cord, which in the posterior rounded extremity of the body forms a bulbous swelling, goes forward, sending out on both sides a number of branches, and winds itself at last round the oesophagus, forming there the usual nerve-ring.

The color is yellowish white, shining like mother of pearl. The proboscis a little darker. Occurs rarely, in the Korsfjord at Bergen and in Søndfjord, at the depth of 100—150 fathoms, clayey bottom.

SPECIFIC CHARACTERISTICS.

The body cylindrical with 24 strong longitudinal ribs, The proboscis about $^1/_3$ of the length of the body, furnished with numerous prominent papillæ. The glans strongly defined with a free ridge (prominence), surrounding the back and sides, but in the middle of the ventral surface, forming a furrow. 3 layers of muscles, annular, oblique and longitudinal.

FORKLARING OVER FIGURERNE.

Tab. 13. Fig. 1. Sipunculus priapuloides, naturlig Størrelse, seet fra Ryggen. *a* Analaabning; *lr* Længdemuskler; *v, v* den frie crenulerede Rand paa Glans; *g* Glans; *l* fremragende Læbe; *p* Snabel.

Fig. 2. Seet fra Bugen. *f* Furen paa Glans; *m, m* Furens Rand; *v, v* den frie, ikke crenulerede Rand paa Glans; *l* Grube og Læben.

Fig. 3. Sipunculus priapuloides, aabnet, naturlig Størrelse. *d* Divertikel; *r, r* Retractorer; *re* Rectum; *m* Længdemuskler; *sp* Spindelmuskel; *o* kjertelformige Organer; *s, s* Segmentalorganer; *ta* Tarm; *t* Tentakler.

Fig. 4 A. Peritoneum med Indgangsaabning for Respirationskar, stærkt forstørret. *i* Indgangsaabning for Karret; *p, p* Peritoneum; *f, f* Muskelfibre og deres Krydsning.

Fig. 4 B. Væg af et Kar, stærkt forstørret. *f* Muskelfibrenes Krydsning i Peritoneum.

Fig. 5. Gjennemsnit af Huden parallelt med Ringmusklerne, stærkt forstørret. *c* Cuticula; *e* Cellelaget; *r* Ringmuskler; *l* Længdemuskler; *p* Peritoneum; *ct* Cutis; *rk* Respirationskar (Keferstein).

Fig. 6. Perpendiculært Hudgjennemsnit paa Ringmusklerne i et Mellemrum mellem to Længdemuskler. *c* Cuticula; *e* Cellelaget; *k, k* Kar; *r* Ringmuskler; *p* Peritoneum; *b* Communicationsaabningen mellem Peritonealhulheden og Respirationskarret, fyldt med sammenpakket Masse af Blodlegemer.

PHASCOLOSOMA LOVÉNII, Nobis.

(Tab. 14, Fig. 17—21.)

Legemet cylindrisk, overalt tæt besat med Papiller, 100 Mm. langt, hvoraf Snabelen indtager omtrent den halve Længde. Den bagerste, afrundede Ende er lidt tilspidset. Kroppen er paa det Bredeste 13 Mm., men aftager i Tykkelse henimod Analaabningen. Strax foran denne, lige ved Snabelens Begyndelse, ere Papillerne større, mere fremragende og danne ligesom et Belte af omtr. 10 Mm. Bredde; længere fortil paa Snabelen blive Papillerne mindre og mere spredte. Overalt ere disse Papiller lidt conisk fremspringende, forsynede med en Aabning, i hvis Omkreds sees en Mængde hornagtige Granulationer (Fig. 21 g, g). Munden aabner sig nærmere Bugsiden med en Tværspalte, hvorved der dannes ligesom 2 Læber, der omsluttes af en fremstaaende Rand (Fig. 19). Den underste Læbe er den største og noget hvælvet fortil; den øverste er smalere, men mere fremspringende, næsten halvmaaneformig og har paa sin Hvælving omtr. 30 Tentakler, der sidde i to afvexlende Rækker.[1]) Spiserøret langt og smalt, løber i en lige Linie langs Retractorerne bag mod det Sted, hvor Segmentalorganerne tage deres Begyndelse; derfra gaar det over i den spiralformige Tarm, som for en stor Del er bedækket af Generationsorganet (Fig. 18 g), slaar sig derpaa omtr. 10 Mm. fra Kropshulhedens Bund fortil, og ender i en kort Endetarm, der ved en Mængde senede Traade er fæstet til Længdemusklerne (Fig. 18 r). Nedentil er Tarmkanalen

[1]) Noget Lignende finder ogsaa Sted ifølge Grubes Iagttagelser ved Phasc. granulatum, Leuck., Phasc. asperum, Gr. og Phasc. semirugosum, Gr.

EXPLANATION OF THE FIGURES.

Tab. 13, fig. 1. Sipunculus priapuloides, natural size, viewed from the dorsal side. *a* the anal aperture; *lr* longitudinal muscles; *v, v* the free crenelated margin on the glans; *g* the glans; *l* projecting lip; *p* proboscis.

Fig. 2. Viewed from the ventral side. *f* furrow on the glans; *m, m* margin of the furrow; *v, v* the free, not crenelated margin on the glans; *l* cavity and lip.

Fig. 3. S. priapuloides, open, natural size. *d* diverticle; *r, r* retractor; *re* rectum; *m* longitudinal muscles; *sp* fusiform muscle; *o* glandulous organs; *s, s* segmental organs; *ta* intestine; *t* tentacles.

Fig. 4 A. Peritoneum with entrance apertures for the respiratory vessels, strongly magnified. *i* the entrance opening for the vessel; *p, p* peritoneum; *f, f* muscular fibres and their intersection.

Fig. 4 B. Wall of a vessel strongly magnified. *f* intersection of the muscular fibres in the peritoneum.

Fig. 5. Section of the cutis parallel with the annular muscles strongly magnified. *c* cuticula; *e* layer of cells; *r* annular muscles; *l* longitudinal muscles; *p* peritoneum. *ct* cutis; *rk* respiratory vessels (Keferstein).

Fig. 6. Perpendicular section of the skin on the annular muscles in an interval between two longitudinal muscles. *c* cuticula; *e* layer of cells; *k, k* vessels; *r* annular muscles; *p* peritoneum; *b* apertures of communication between the peritoneal cavity and the respiratory vessel filled with an agglomerated mass of blood globules.

PHASCOLOSOMA LOVÉNII, Nobis.

(Tab. 14, fig. 17—21).

The body cylindrical, everywhere densely covered with papillæ; 100 Mm. long; the proboscis occupying about half the length. The posterior rounded extremity is a little tapered. The body is at the broadest part 13 Mm., but diminishes in thickness toward the anal aperture; immediately before the latter, close to the commencement of the proboscis, the papillæ are larger, more prominent, and form, as it were, a belt of about 10 Mm. in breadth; further forward on the proboscis, the papillæ are smaller and more dispersed. Everywhere these papillæ are a little conically prominent, with an aperture, in the periphery of which there appear a number of horny granulations (fig. 21 g, g). The mouth opens nearer to the ventral side with a transverse slit, whereby there are formed, as it were, 2 lips surrounded by a prominent margin (fig. 19). The under lip is the larger and somewhat arched forward; the upper lip is smaller, but more prominent, nearly semilunar, and has on its arch about 30 tentacles, situated in two alternate series[1]). The oesophagus, long and narrow, runs in a straight line, along the retractors, backwards towards the place where the segmental organs have their commencement, and thence goes over into the spiral intestine, which in great part is covered by the organ of generation (fig. 18 g), turning afterwards forward, about 10 Mm. from the bottom of the perivisceral cavity, and terminates

[1]) Something similar exists also according to Grube's observations in the Phasc. granulatum, Leuck, Phasc. asperum, Gr. and Phasc. semirugosum, Gr.

ikke befæstet. Segmentalorganerne ere meget lange, indtage omtr. $^1/_4$ af Kroppens Længde, ere stærkt contractile, hvorved de paa flere Steder danne blæreformige Udvidninger (Fig. 18 s, s); nogen Aabning paa den frie Ende findes ikke. Ringmusklerne danne saagodtsom et eneste Lag, dog sees i den bagerste Del af Kroppen enkelte Fibre at vige fra hinanden, uden dog at danne særskilte Strenge. Længdemuskellaget danner i den forreste Halvdel af Legemet en sammenhængende Muskelhud; ved Segmentalorganernes Befæstningssted udskille derimod Længdemusklerne sig som særskilte, temmelig langt fra hinanden staaende, brede Bundter, der ere omtrent 24 i Antal (Fig. 18 lm). Disse Muskelbundter anastomosere tildels med hinanden, og strække sig mod Kroppens bagerste Ende, hvor de blive smalere og svagere fremtrædende. De tvende Bugretractorer tage deres Udspring omtrent paa Kroppens bagerste Trediedel fra Længdemusklerne med 6 korte Rødder, der strax smelte sammen til en bred Basis. Fra denne brede Grunddel gaa de convergerende paa hver sin Side til henimod Segmentalorganernes Tilhæftningssted, hvor de med deres Rande smelte sammen, og danne derved lige op til Mundaabningen ligesom en Skede, hvori Spiserøret ligger (Fig. 18 br). Rygretractorerne udgaa med 3 korte Rødder, der danne deres smale Grunddel, fra Længdemusklerne, noget foran Bugretractorernes Udspring; de ere temmelig tynde og forene sig snart med Bugretractorerne. Ved disses Grunddel sees et tyndt, slangeformigt Organ, der ligesom omsnoer deres Basis (Fig. 18 o, o). Kropshulheden og de i den indesluttede Organer ere beklædte med et Peritoneum, hvori findes Celler. Saavel dette, som de i Huden indesluttede Legemer (Kjertler), ere beskrevne i den generelle Del, hvortil henvises. Generationsorganet omgiver omtr. de 2 bagerste Trediedele af Tarmspiralen som en compact Masse (se den generelle Del). Farven lysegraa med perlemoragtig Glands. Papillerne mørkere. Fundet i Bergensfjorden, 50 Favnes Dyb, stenet Bund, kun 1 Exemplar.

ARTSCHARACTEREN.

Kroppen næsten kølleformig, papilløs. Snabelen indtager næsten Dyrets halve Længde. Papillerne paa dens bagerste, bredere Del ere store, og danne et bredt Belte. Mundaabningen tværspaltet, paa den øverste Læbe en dobbelt Række Tentakler, omtr. 30. Længdemusklerne danne paa den bagerste Halvdel af Legemet tydelig adskilte Bundter (omtr. 24). Farven lysegraa med mørkere Papiller.

FORKLARING OVER FIGURERNE.

Tab. 14. Fig. 17. Phascolosoma Lovénii i naturlig Størrelse.
Fig. 18. Samme aabnet. *g* Generationsorganet; *br* Skeden for Spiserøret; *lm* Længdemuskler; *o, o* slangeformige Or-

in a short rectum, which is attached by a number of tendinous filaments to the longitudinal muscles (Fig. 18 r). Below, the intestinal canal is not attached. The segmental organs are very long, occupying about $^1/_4$ of the length of the body; they are strongly contractile, whereby they form in many places bladder-like enlargements (fig. 18 s, s); there exists no opening at the free extremity. The annular muscles form almost a single layer; still in the posterior part of the body some fibres appear, receding from each other, although without forming separate cords. The longitudinal layer of muscles forms, in the anterior half of the body, a continuous muscular membrane; but at the place of attachment of the segmental organs, the longitudinal muscles appear as separate, rather distant, broad fascicles, which are about 24 in number (fig. 18 lm). These fascicles of muscles partly anastomose with each other, and extend towards the posterior extremity of the body, where they become narrower and less conspicuous. The two ventral retractors take their issue, about on the posterior third part of the body, from the longitudinal muscles, with 6 short roots, which immediately coalesce to a broad base. From this broad basis, they proceed, converging each on its side, towards the place of attachment of the segmental organs, where they coalesce with their margins, thereby forming right up to the oral aperture, as it were, a sheath wherein the oesophagus lies (fig. 18 br). The dorsal retractors issue, with 3 short roots which form their narrow basis, from the longitudinal muscles, somewhat in front of the source of the ventral retractors; they are rather thin, and soon unite with the ventral retractors. At the basal part of the latter, there appears a long serpentine organ which in a manner winds round their base (fig. 18 o, o). The perivisceral cavity and the organs contained in it are covered with a peritoneum wherein cells exist. This peritoneum, and likewise the bodies (glands) contained in the skin, are described in the general notice, to which we refer. The organ of generation surrounds about the 2 posterior third parts of the intestinal spiral like a compact mass (see the general notice). The color is light grey with mother of pearl lustre. The papillæ darker. Found in the Bergensfjord at the depth of 50 fathoms, stoney bottom, only 1 specimen.

SPECIFIC CHARACTERISTICS.

The body nearly club-shaped, with papillæ. The proboscis occupies nearly half the length of the animal. The papillæ on its posterior broader part are large, and form a broad belt. The oral aperture a transverse fissure; on its upper lip a double row of tentacles about 30. The longitudinal muscles form, on the posterior half of the body, distinctly separate fascicles (about 24). The color light grey with darker papillæ.

EXPLANATION OF THE FIGURES.

Tab. 14, fig. 17. Phascolosoma Lovénii, natural size.
Fig. 18. The same opened. *g* the organ of generation; *br* the sheath of the œsophagus; *lm* longitudinal muscles; *o, o*

ganer; *r* Rectum; *rr* Bugretractorer; *s, s* Segmentalorganer; *sp* Spiserør; *t* Tarmspiralen; *k* contractilt Kar; *n* Nerve.

Fig. 19. Forreste Ende af Snabelen med Mundaabning og Tentakler.

Fig. 20. Hudlegeme, seet under svag Forstørrelse.

Fig. 21. Gjennemsnit af Huden, 300 Gange forstørret. *c, c, c* Cuticula; *d* cylindriske Celler; *g, g* compact Pigment; *h, h, h* stjerneformigt Pigment; *e* Cuticularepithelet; *r* Ringmuskler; *l* Længdemuskler; *f* Udførselskanal for Hudlegemet; *p, p* Peritoneum; *a, a* Hudlegemer.

PHASCOLOSOMA SQUAMATUM, Nobis.

(Tab. 13, Fig. 11. Tab. 14, Fig. 14—15.)

Kroppen, omtr. 11 Mm. lang, er kølleformig; den bagerste afrundede Ende er bredest, 3 Mm., — overalt tæt besat med temmelig store, faste, flade, uregelmæssig formede og ophøiede Skjæl. Imellem disse findes smaa Sandpartikler (Quartskorn) tilheftede Huden ved et seigt Slim. Analaabningen rund lige ved Snabelens Begyndelse. Denne er 28 Mm. lang, halv gjennemsigtig og forsynet med yderst fine Papiller, der staa langt fra hverandre i Rækker, men blive tættere opimod Tentaklerne. Disse ere korte, traadformige, 8 i Antal. Huden er fast, temmelig tyk, seig og papilløs, bedækket paa dens indre Flade med det sædvanlige Muskellag af Ring- og Længdefibre, der ere beklædte af Peritoneum. Der findes kun én Retractor, der tager sit Udspring fra Bunden af Kropshulheden med fire korte Rødder, og gaar saa fortil som en rund, lige Søile midt igjennem Kropshulheden og Snabelen for at fæste sig ved Grunden af Tentakelkrandsen. Spiserøret ligger først omsluttet af Retractorens Fibre ved deres Insertion; men kommer strax frem for, som et tyndt Rør, at følge Retractoren til omtr. 5 Mm. fra dennes Udspring. Nu udvides det betydeligt, idet det gaar over i Tarmen, der paa høire Side af Retractor danner 5 løse, lange Slyngninger, som ligge paalangs i Kropshulheden, hvoraf den sidste Slynge naar næsten ned til Retractorens Rødder; herfra stiger den under denne fortil langs den venstre Side af Retractor omtr. $^2/_3$ af Kropshulhedens Længde for med en skarp Bøining at gaa over i den spiralformede Del af Tarmen, der ender i en lang, temmelig smal Rectum (Fig. 14 rc), som lige ved dens Udmunding er fæstet til Huden ved et tyndt Muskelbundt. Hvor Tarmen gaar over i Rectum findes en liden Divertikel, der corresponderer med Tarmhulheden. Langs Spiserøret, men fæstet til Snabelens indvendige Flade med et Slags Mesenterium, findes et yderst tyndt, rørformigt, contractilt Kar, der tager sin Begyndelse fra Tentakelkrandsen, og strækker sig lige ned til Snabelens Ende (længere kunde det ikke forfølges). Generationsorganet er fæstet til Spiserøret og Tarmslyngerne og strækker sig fortil opimod Segmentalorganet, og bagtil lige til Kropshulhedens Bund. Segmentalorganet har en Pæreform og ligger til venstre Side af Retractor strax foran Tarmspiralen. Nervestrengen gaar lige fra Bunden af Kropshul-

serpentine organs; *r* rectum; *rr* ventral retractors; *s, s* segmental organs; *sp* œsophagus; *t* spiral of the intestine; *k* contractile vessel; *n* nerve.

Fig. 19. Anterior extremity of the proboscis with oral aperture and tentacles.

Fig. 20. Cuticular body, slightly magnified.

Fig. 21. Section of skin, magnified 300 times. *c, c, c* cuticula; *d* cylindrical cells; *g, g* compact pigment; *e* cuticular epithelium; *r* annular muscles; *l* longitudinal muscles; *f* excretory duct for the cuticular body; *p, p* peritoneum; *a, a* cuticular bodies; *h, h, h* radiated pigment.

PHASCOLOSOMA SQUAMATUM, Nobis.

(Tab. 13, fig. 11. Tab. 14, fig. 14—15.)

The body, about 11 Mm. long, is claviform; the posterior rounded extremity is broadest, 3 Mm., everywhere densely covered with rather large, firm, flat, irregularly formed and elevated scales. Between these there are found small particles of sand (grains of quarts) stuck to the skin by a tough slime. The anal aperture round, and close to the commencement of the proboscis. The latter is 28 Mm. long, semi-transparent and furnished with extremely fine papillæ, which are situated far from each other in rows, but become more closely placed towards the tentacles. These are short filiform 8 in number. The skin is firm, rather thick, tough and with papillæ, lined on its inner side with the usual muscular layer of annular and longitudinal fibres covered by the peritoneum. There is only one retractor, which takes its issue from the bottom of the perivisceral cavity with 4 short roots, and goes then forward, like a round straight column, through the middle of the perivisceral cavity and the proboscis, attaching itself at the base of the tentacular circlet. The oesophagus lies at first surrounded by the fibres of the retractor at their insertion, but soon comes out, and, like a thin tube, accompanies the retractor to within about 5 Mm. of its source. Now it is extended considerably, going over into the intestine, which on the right side of the retractor forms 5 loose long slings lying lengthwise in the perivisceral cavity, and of which the last sling extends nearly to the roots of the retractor; hence it rises under the latter, forward along the left side of the retractor, about $^2/_3$ of the length of the perivisceral cavity, going over with a sharp turn into the spiral part of the intestine which ends in a long rather narrow rectum (fig. 14 rc), attached, close to its orifice, to the skin by a thin fascicle of muscles. Where the intestine goes over into the rectum, there is a little diverticle corresponding with the cavity of the intestine. Along the oesophagus, but attached to the interior surface of the proboscis by a sort of mesentery, there is an extremely thin tubular contractile vessel, which takes its beginning from the tentacular circlet and extends right down to the end of the proboscis (it could not be traced further). The organ of generation is attached to the oesophagus and to the circumvolutions of the intestine;

heden og henimod Tentakelkrandsen, hvor den som sædvanligt med to Grene omfatter Spiserøret.

Kroppen er rustfarvet; Snabelen er ved Grunden gul, forresten næsten hvid, perlemor-glindsende.

Den er funden i Hardangerfjorden og Korsfjorden paa en Dybde af 100—200 Favne, sandig — leret Bund. Paa enkelte Localiteter ikke saa ganske sjelden.

Af denne Art findes et Par Farvevarieteter, den ene olivengrøn, som først fandtes af Danielssen i Hardangerfjord og senere af G. O. Sars i Lofoten, og som af M. Sars er bleven benævnt Phascolosoma olivaceum, uden dog at blive beskrevet. — Den anden Varietet er dels brun med grønne Pletter, dels grøn med brune Pletter. Begge disse Varieteter findes paa de samme Steder som Hovedformen.

ARTSCHARACTEREN.

Kroppen kølleformig, overalt besat med faste, flade, uregelmæssig formede, ophøiede Skjæl. Snabelen omtr. $2^1/_2$ Gang saa lang som Kroppen, besat med Papiller og forsynet med 8 Tentakler. En Retractor. Et Segmentalorgan.

FORKLARING OVER FIGURERNE.

Tab. 13, Fig. 11. Phascolosoma squamatum, lidt forstørret.

Tab. 14, Fig. 14. Den samme, aabnet, forstørret. *g* Æggestok; *n* Nerve; *r, r* Retractor med 4 Rødder; *t* Tarm; *ts* spiralformig Tarmslynge; *sp, sp* Spiserør; *rc* Rectum; *m* Muskel; *s* Segmentalorgan; *k, k* contractilt Kar.

Fig. 14 A. Tværsnit af Snabelen for at vise Forholdet mellem Retractor, Spiserør, Nervestreng og contractilt Kar.

Fig. 15. Gjennemsnit af Huden af Phascolosoma squamatum, 600 Gange forstørret. *a* Hudlegeme; *b* Udførselsgang; *c* Cuticula; *e* Cuticularepithel; *l, l, l* Længdemuskler; Gjennemsnittene af Fibrene liggende i Rum af et netformigt, rørdannende Sarcolemma, hvori Kjerner; *r* Ringmuskler; *p* Peritoneum.

PHASCOLOSOMA ABYSSORUM, Nobis.

(Tab. 14, Fig. 25—27).

Kroppen valseformig, 30 Mm. lang, 2,5 Mm. bred, glat, overalt besat med en Mængde fine uregelmæssig tætstaaende Hudlegemer, der ikke danne Papiller. Den bagerste Ende af Kroppen er afstumpet, og paa Midten sees en liden vorteformig Fremstaaenhed, der kan indtrækkes, og da fremkommer en liden Grube. Snabelen, omtrent en Fjerdedel saa lang som Kroppen, er paa Grunddelen besat med yderst fine Papiller; derimod er dens midterste Del ganske glat, og dens forreste Del, der næsten er kugleformig, er forsynet med 10—12 Ringe med

and it extends forward up towards the segmental organ, and backward right to te bottom of the perivisceral cavity. The segmental organ has the form of a pear, and lies on the left side of the retractor, immediately in front of the intestinal spiral. The nervous cord goes straight from the bottom of the perivisceral cavity and towards the tentacular circlet, where as usual it surrounds the oesophagus with two branches.

The body is of a ferruginous color; the probosc is at the basis yellow, otherwise nearly white, shining like mother of pearl.

It is found in the Hardangerfjord and in the Korsfjord, at a depth of 100—200 fathoms, on sandy — clayey bottom. In some localities it is not so very rare.

Of this species a few colored varieties are found: one is olive-green, first found by Danielssen in the Hardangerfjord, and subsequently by G. O. Sars in Lofoten, and named by M. Sars Phascolosoma olivaceum, without however being described. The other variety is partly brown with green spots, partly green with brown spots. Both these varieties are found in the same places as the main form.

SPECIFIC CHARACTERISTICS.

The body claviform, everywhere covered with firm, flat, irregularly shaped, elevated scales. The proboscis about $2^1/_2$ times as long as the body, covered with papillæ, and furnished with 8 tentacles. One retractor. One segmental organ.

EXPLANATION OF THE FIGURES.

Tab. 13, fig. 11. Phascolosoma squamatum, slightly magnified.

Tab. 14, fig. 14. The same opened, magnified. *g* ovary; *n* nerve; *r, r* retractor with 4 roots; *t* intestine; *ts* spiral circumvolutions of intestine; *sp, sp* oesophagus; *rc* rectum; *m* muscle; *s* segmental organ; *k, k* contractile vessel.

Fig. 14. A. Transverse section of proboscis shewing the connexion between the retractor, the oesophagus, the nervous cord and the contractile vessel.

Fig. 15. Section of skin of P. squamatum, magnified 600 times. *a* cuticular body; *b* excretory duct; *c* cuticula; *e* cuticular epithelium; *l, l, l* longitudinal muscles. The sections of the fibres lying in the space of a reticulated tubular sarcolemma in which lie the nuclei; *r* the annular muscles; *p* peritoneum.

PHASCOLOSOMA ABYSSORUM, Nobis.

(Tab. 14, fig. 25—27).

The body cylindrical, 30 Mm. long, 2,5 Mm. broad, smooth, everywhere covered with a number of fine irregularly densely collected cuticular bodies, which do not form papillæ. The posterior end of the body is obtuse; and on the middle there appears a little wart-like prominence, which can be retracted, producing then a little hollow. The proboscis, about a fourth part as long as the body, is on the basal part covered with extremely fine papillæ; but its middle part is quite smooth; and its anterior part, which is nearly globular, is furnished

stærke, krumme Hager og bærer en Rad med 20—24 cylindriske Tentakler. Huden mat, svagt iriserende, fast og halvgjennemskinnende. Paa dens indre Flade de to sædvanlige Muskellag. To Retractorer, der ere temmelig tykke, udspringe med en bred Basis omtr. fra Midten af Bugfladen og gaa adskilte hen til Snabelens forreste Del, hvor de omgive Spiserøret (Fig 26 r). Ved Retractorernes Grunddel sees et tyndt, slangeformigt Organ (Fig. 26 o). Spiserøret, der er temmelig kort og ledsaget af det contractile Kar, gaar over i en lang Tarm, der danner omkring 36 Slyngninger, hvoraf den bagerste naar lige til Kropshulhedens Bund (Fig 26 sp). Tarmspiralen er paa et Par Steder fæstet til Kropsvæggen, men dens bagerste Ende er fri. Rectum kort (Fig. 26 rc). Ingen Spindelmuskel. 2 Segmentalorganer (Fig. 26 s, s), der hænge frit og ere orangefarvede. Nervestrengen løber mellem Retractorernes Grunddel (Fig. 26 n).

Farven lysegul, men paa Kroppens bagerste Ende og ved Grunden af Snabelen er der et noget mørkere farvet Belte. Snabelens Midtparti er næsten hvidt, stærkt perlemor-glindsende.

Fundet i Bergensfjorden i de Gange, som dannes paa Lima excavata af Cliona abyssorum, Sars, 200—300 Favnes Dyb, stenet Bund. Sjelden. Denne Art kommer nærmest Forbes's Syrinx (Phascol.) Harveii; men adskiller sig dog fra denne derved, at Kroppen er ganske glat, uden Papiller, med en utallig Mængde Hudlegemer, at Kroppens bagerste Ende er afstumpet, at Huden er fast, at Hagerne ere tykkere og mere krumbøiede, at der kun er en Tentakelrad, at den kun har 2 Retractorer, og endelig at Tarmen har mere end 30 Vindinger.

ARTSCHARACTEREN.

Kroppen valseformig, langstrakt, glat, omtrent 10 Gange saa lang som tyk, besat med en utallig Mængde smaa Hudlegemer, uden Papiller. Snabelen omtrent $^1/_4$ af Kroppens Længde, ved Grunden besat med fine Papiller, og paa dens forreste Ende et bredt Belte af 10—12 Ringe med Hager. Tentaklerne 20—24. To Retractorer. Farven lysegul med et mørkere Belte paa Snabelens Grunddel og paa Kroppens bagerste Ende.

FORKLARING OVER FIGURERNE.

Tab. 14, Fig. 25. Phascolosoma abyssorum, lidt forstørret.
Fig. 26. *n* Nervestreng; *o* slangeformigt Organ; *r* Bugretractorerne; *rc* Rectum; *s, s* Segmentalorgan; *sp* Spiserør; *t* Tarmspiralen.
Fig. 27. Tvende Hager, stærkt forstørret.

PHASCOLOSOMA PALLIDUM, Nobis.

(Tab. 14, Fig. 22—24).

Kroppen er stump tapformig, 28 Mm. lang, 4 Mm. bred, forsynet med runde i Spidsen fladtrykte Papiller, der ere temmelig fremragende, men blive paa den bagerste

with 10—12 rings with strong bent hooks, and bears a row of 20—24 cylindrical tentacles. The skin dull, slightly iridescent, firm and half transparent. On its interior surface, the two usual layers of muscles. Two retractors, which are rather thick, issue with a broad basis from about the middle of the ventral surface, proceding separately to the anterior part of the proboscis, where they surround the oesophagus (fig. 26 r). At the basal part of the retractors, there is a thin serpentine organ (fig. 26 o). The oesophagus, which is rather short and accompanied by the contractile vessel, goes over into a long intestine, forming about 36 circumvolutions, of which the posterior one reaches right to the bottom of the perivisceral cavity (fig. 26 sp). The intestinal spiral is in a few places attached to the wall of the body; but its posterior extremity is free. The rectum, short (fig. 26 rc). No fusiform muscle. 2 segmental organs (fig. 26 s, s), hang freely and are orange-colored. The nervous cord runs between the basal parts of the retractors (fig. 26 n).

The color is light yellow; but on the posterior extremity of the body, and at the basis of the proboscis, there is a somewhat more darkly colored belt. The middle part of the proboscis is nearly white, strongly shining like mother of pearl.

Found in the Bergensfjord in the canals formed on the Lima excavata by the Cliona abyssorum, Sars, at a depth of 200—300 fathoms, stony bottom. Rare. This species comes nearest to Forbes's Syrinx (Phascol.) Harveii, but differs however from the latter: by the body being quite smooth without papillæ, with an innumerable quantity of cuticular bodies; by the posterior part of the body being truncated; by the skin being firm; by the hooks being thicker and more bent; by there being only one row of tentacles; by having only 2 retractors, and finally by the intestine having more than 30 windings.

SPECIFIC CHARACTERISTICS.

The body cylindrical, elongated, smooth, about 10 times as long as it is thick, covered with an innumerable quantity of small cuticular bodies, without papillæ. The proboscis about $^1/_4$ of the length of the body, at the base covered with fine papillæ, and on the anterior extremity a broad belt of 10—12 rings with hooks. The tentacles 20—24. Two retractors. The color light yellow, with a darker belt on the basal part of the proboscis, and on the posterior extremity of the body.

EXPLANATION OF THE FIGURES.

Tab. 14, fig. 25. Phascolosoma abyssorum, slightly magnified.
Fig. 26. *n* nervous cord; *o* serpentine organ; *r* ventral retractors; *rc* rectum; *s, s* segmental organs; *sp* oesophagus; *t* spiral of intestine.
Fig. 27. Two hooks, strongly magnified.

PHASCOLOSOMA PALLIDUM, Nobis.

(Tab. 14, fig. 22—24).

The body is obtusely plug-shaped, 28 Mm. long, 4 Mm. broad, furnished with round papillæ flattened at the point, which are rather prominent, but become on

Ende haardere, tykkere, mere coniske og antage en brunsort Farve. Huden halv gjennemskinnende, saa at den mørke Tarm kan skimtes. Snabelen, der er 9 Mm. lang, har ved dens Grunddel et temmelig bredt Belte af tykke, stumpe, fremragende, brunsorte Papiller (Fig. 22 p), medens den øvrige Del er tæt besat med yderst fine Papiller, der give den et villøst Udseende. Snabelens øverste Ende bærer omtrent 16 tykke Tentakler, der sidde i én Række om Munden; og strax nedenfor Tentakelranden sees 4 lidt uregelmæssige Rækker af tykke, meget krumme Hager (Fig. 22 h, Fig. 24). Spiserøret kort, temmelig tyndt (Fig. 23 sp), og gaar over i Tarmen ved at gjøre en Bøining mod Høire, hvorved Tarmen gaar igjennem den spaltede Retractor (Fig. 23 t). Nu danner den et Par Bugtninger (Fig. 23 t^1), stiger derpaa forover, gjør atter nogle Slyngninger (Fig. 23 t^2), gaar saa langt bagover i Linie med den korteste Retractor (Fig. 23 t^3), gjør en temmelig stor Slynge, løber nu et godt Stykke forover, hvor den paany bøier sig (Fig. 23 t^4), og idet den atter gaar bagover, danner den 7—8 Slyngninger, der endelig gaa over i en meget lang, tyk, næsten ligeløbende Rectum (Fig. 23 r, r), som udmunder ved Grunden af Snabelen. Spidsen af Tarmspiralen kommer saaledes til at ligge omtrent i Midten af Kropshulheden (Fig. 23 t^4). Der er kun et Segmentalorgan (Fig. 23 s), som er kort, tykt og ligger til høire Side. Huden er forsynet med sine sædvanlige to Muskellag. To Retractorer; den ene, der tager sit Udspring med en lidt bredere Basis omtrent paa Midten af Kroppens bagerste Fjerdedel (Fig. 23 r^2), spalter sig — efter at være naaet 6—8 Mm. forover — i to tykke Strenge (Fig. 23 r^3), der atter henimod Spiserøret forene sig; gjennem denne Spalte gaar en Tarmslynge, som ovenfor omtalt. Den anden Retractor tager sit Udspring fortil paa Kroppens bagerste Fjerdedel med to korte, men stærke Rødder (Fig. 23 r^1), og gaar saa forover mod Spiserøret, hvor den forener sig med den føromtalte, og danner ligesom en Skede om Spiserøret. Der findes intet contractilt Kar. Nervestrengen løber som almindeligt imellem begge Retractorer (Fig. 23 n, n). Kropshulheden og de i den placerede Organer ere beklædte med et celleholdigt Peritoneum, ligt det, vi have beskrevet i den generelle Del, og som forøvrigt findes hos alle de Phascolosoma-Arter, vi have undersøgt.

Kroppen har en bleggul Farve. Snabelen brun med hvidgule Tentakler. I Bergensfjorden paa 200 Favnes Dyb, lerblandet Sand. Kun et Exemplar i Røret af Pectinaria auricoma.

ARTSCHARACTEREN.

Kroppen 28 Mm. lang, tapformig, besat med adspredte, i Spidsen fladtrykte, fremragende Papiller, der paa dens bagerste afstumpede Ende ere tykkere, haardere og have en brunsort Farve. Snabelen, 9 Mm. lang, er ved dens Grunddel forsynet med et bredt Belte af brunsorte, tykke, stumpe, fremragende Papiller, forøvrigt tæt besat med

the posterior extremity harder, thicker, more conical, and assume a brownish black color. The skin half-transparent, so as to shew the dark intestine. The proboscis, which is 9 Mm. long, has at its basal part a rather wide belt of thick obtuse, prominent, brownish black papillæ (fig. 22 p), while the remaining part is densely covered with extremely fine papillæ which give it a villous appearance. The upper extremity of the proboscis bears about 16 thick tentacles situated in a row round the mouth; and immediately below the tentacular circlet, there appear 4 slightly irregular rows of thick, very much bent hooks (fig. 22 h, fig. 24). The oesophagus is short, rather thin (fig. 23 sp) and goes over into the intestine with a bend to the right, whereby the intestine goes through the divided retractor (fig. 23 t). Now it forms a few circumvolutions (fig. 23 t^1), then rises forward, makes again some circumvolutions (fig. 23 t^2), and then goes backward in a line with the shortest retractor (fig. 23 t^3); makes a rather large sling, and runs some distance forward, where it turns once more (fig. 23 t^4), and returning backward again, it forms 7—8 circumvolutions which finally go over into a very long, thick, nearly straight rectum (fig. 23 r, r), which has its orifice at the base of the proboscis. The apex of the intestinal spiral comes thus to lie about in the middle of the perivisceral cavity (fig. 23 t^4). There is only one segmental organ (fig. 23 s), which is short, thick and situated on the right side. The skin is furnished with its usual two layers of muscles. Two retractors, one taking its issue with a little broader base, about in the middle of the posterior quarter of the body (fig. 23 r^2), divides itself — after having advanced forward 6—8 Mm. — into two thick cords (fig. 23 r^3), which again unite towards the oesophagus; through this fissure goes a sling of the intestine as before noticed. The other retractor takes its issue forward on the posterior quarter of the body, with two short but strong roots (fig. 23 r^1), advancing towards the oesophagus, where it joins the retractor first mentioned, forming, as it were, a sheath round the oesophagus. There is no contractile vessel. The nervous cord runs as usual between both retractors (fig. 23 n, n). The perivisceral cavity and the organs situated in it are covered with a peritoneum containing cells like that described in the general notice, and which moreover is found in all the species of Phascolosoma, that we have examined.

The body has a pale yellow color. The proboscis brown, with whitish yellow tentacles. In the Bergensfjord at the depth of 200 fathoms, sand mixed with clay. Only one specimen in the tube of Pectinaria auricoma.

SPECIFIC CHARACTERISTICS.

The body 28 Mm. long, plug-shaped, covered with dispersed prominent papillæ flattened at the point, and at their posterior truncated extremity thicker, harder and of a brownish black color. The proboscis 9 Mm. long, and having at its basal part a broad belt of brownish black, thick, obtuse, prominent papillæ, the remaining

yderst fine brune Papiller. Ved Snabelens forreste Ende 4 uregelmæssige Rækker af tykke, stærkt krummede Hager. Tentaklerne tykke, omkring 16. To Retractorer. Et Segmentalorgan.

FORKLARING OVER FIGURERNE.

Tab. 14, Fig. 22. Phascolosoma pallidum, lidt forstørret. *h* Hager; *p* Papiller.

Fig. 23. Ph. pallidum med indtrukken Snabel, aabnet og noget forstørret. *n, n* Nerven; *r, r* Rectum; r^1 Retractor med to Rødder; r^2 Retractoren, der deler sig; r^3 Retractorens Spaltning; *s* Segmentalorgan; *sp* Spiserør; *t* Tarmslynge gjennem den spaltede Retractor; t^1 Tarmbugtning; t^2 Tarmslynge; t^3 bagerste Tarmslynge; t^4 Spidsen af Tarmspiralen.

Fig. 24. En krum Hage, stærkt forstørret.

PHASCOLOSOMA (SIPUNCULUS) EREMITA, Sars.

(Tab. 15, Fig. 45).

Nyt Magazin f. Naturvidenskaberne 1851, Pag. 197.

Chondrosoma lœve, Ørsted.
(Mus. Hafn.)

Phascolosoma boreale, Keferstein.
Nachrichten d. k. Ges. der Wissensch. Göttingen. 1865, Pag 206.
Zeitschrift f. wissensch. Zoologie, 1865, Pag. 437. Taf. XXXI, Fig. 7., Taf. XXXIII, Fig. 33.

Kroppen omtrent 3 Gange saa lang som tyk, furet paa tvers og besat med overmaade smaa Papiller, der danne ufuldkomne, bugtede Længderader, hvorved Huden faar et noget reticuleret Udseende; dens bagerste Ende kort tilspidset. Snabelen mindst lige saa lang som Kroppen, forsynet med smaa Papiller, der sidde tættest ved Grunden, og ophøre ganske omtr. 2 Mm. bagenfor Tentakelkrandsen, hvor Huden er saagodtsom glat. Analaabningen danner en temmelig stor fremragende Papille. Paa den indvendige Flade af Huden findes de sædvanlige to Muskellag, der ikke danne isolerede Bundter. To Retractorer, der udspringe med en lidt bred Basis fra den midterste Trediedel af Kroppen (Fig. 45 r), løbe forover og forene sig omtr. 2 Mm. fra Snabelens Ende til en Skede, der omgiver Spiserøret (Fig 45 r^1). Ved Retractorernes Grunddel sees et tyndt, traadformigt, hvidglindsende, slangeformigt Organ (Fig. 45 o). Nervestrengen løber imellem Retractorerne og afgiver mange Grene til Muskler, Snabel, Spiserør. Dette løber mellem Retractorerne omtrent til deres Midte (Fig. 45 sp), og gaar saa over i Tarmen, der danner mange Slyngninger, som bagtil ingen Befæstning have, medens den nederste Del af Spiserøret og den første Tarmslynge ere ved lange Traade befæstede til Kropshulheden. Endetarmen er temmelig kort, og til begge Sider heftet ved mange stærke Muskelfibre. Segmentalorganerne ikke meget lange og kun befæstede ved den forreste, brede Ende (Fig. 45 s, s). Generationsorganet omgiver i Form af Lameller saagodtsom ganske Tarmspiralen, hvoraf kun den bagerste Del er ubedækket (Fig. 45 g). Dyrets Længde med udstrakt

part densely covered with extremely fine papillæ. At the anterior extremity of the proboscis, 4 irregular rows of thick, strongly bent hooks. The tentacles thick, about 16. Two retractors. One segmental organ.

EXPLANATION OF THE FIGURES.

Lab. 14, fig. 22. Phascolosoma pallidum, slightly magnified. *h* hook; *p* papillæ.

Fig. 23. P. pallidum, with retracted proboscis, open and slightly magnified. *n, n* nerve; *r, r* rectum; r^1 retractor with two roots; r^2 The retractor which divide itself; r^3 the fissure of the retractor; *s* segmental organ; *sp* oesophagus; *t* turn of intestine through the cleft retractor; t^1 turn of intestine; t^2 circumvolution of intestine; t^3 posterior circumvolution of intestine; t^4 apex of spiral of intestine.

Fig. 24. A bent hook, strongly magnified.

PHASCOLOSOMA (SIPUNCULUS) EREMITA, Sars.

(Tab. 15, fig. 45.)

Nyt Magazin for Naturvidenskaberne 1851, p. 197.

Chondrosoma lœve, Ørsted.
(Mus. Hafn.)

Phascolosoma boreale, Keferstein.
Nachrichten d. k. Ges. der Wissensch. Göttingen. 1865, p. 206.
Zeitschrift f. wissensch. Zoologie, 1865, p. 437. Taf. XXXI, fig. 7., Taf. XXXIII, fig. 33.

The body about 3 times as long as it is thick, furrowed transversally, and covered with extremely small papillæ which form imperfect, sinuous longitudinal rows, whereby the skin acquires a somewhat reticulated appearance; its posterior extremity shortly tapered. The proboscis at least as long as the body, covered with small papillæ, which are closest together at the base, and cease entirely about 2 Mm. behind the tentacular circlet, where the skin is almost smooth. The anal aperture forms a rather large prominent papilla. On the interior surface of the skin are the usual two layers of muscles, which do not form isolated fascicles. Two retractors, issuing with a somewhat broad base from the middle third part of the body (fig. 45 r), run forward, and join themselves, about 2 Mm. from the extremity of the proboscis, to a sheath that surrounds the oesophagus (fig. 45 r^1). At the basal part of the retractors, there appears a thin, filiform, white-shining, serpentine organ (fig. 45 o). The nervous cord runs between the retractors, and sends out several branches to the muscles, to the proboscis and to the oesophagus. The latter runs between the retractors about to the middle of them (fig. 45 sp), and goes then over into the intestine which forms many circumvolutions without attachment on the posterior side; while the lowest part of the oesophagus and the first circumvolution of the intestine are attached to the perivisceral cavity by long filaments. The rectum is rather short, and on both sides attached by many strong muscular fibres. The segmental organs not very long, and only attached at the anterior broad extremity (fig. 45 s, s).

Snabel varierer fra 20—50 Mm. Farven mat graagrøn med lidt mørkere brunliggrønne Papiller.

Fundet i Finmarken, Tromsø og Hammerfest af M. Sars og Danielssen, i Nordland, Bodø, af G. O. Sars. Den lever dels i tomme Conchylier, dels frit paa sandig Bund, 30—40 Favnes Dyb. Ved Norges Kyster er den sjelden, derimod synes den at være temmelig almindelig ved Grønland; thi derfra er Kjøbenhavner-Museet blevet forsynet med mange Exemplarer.

Som det vil erfares af Synonymien, have vi slaaet Kefersteins Ph. boreale sammen med Sars's eremita, hvilket vi anse os berettigede til, efterat vi have havt Anledning til at sammenligne baade Sars's og Kefersteins Originalexemplarer.

FORKLARING OVER FIGURERNE.

Tab. 15, Fig. 45. Phascolosoma eremita, aabnet. *g* Generationsorganet, omgivende Tarmspiralen; *o* slangeformigt Organ; *n* Nervestreng; *s, s* Segmentalorganer; *r* Retractorerne; *r*¹ Retractorerne, dannende en Skede om Spiserøret *sp.*

PHASCOLOSOMA (SIPUNCULUS) MARGARITACEUM, M. Sars.

(Tab. 15, Fig. 43—44).

Nyt Magazin f. Naturvidenskaberne, 6 B, 1851, Pag. 196.
Homalosoma læve, Ørsted (Mus. Hafn.)
Phascolosoma Ørstedii, Keferstein.
Nachricht d. k. Ges. d. Wissensch. Göttingen. 1863, Pag 205.
Zeitschrift f. wiss. Zoologie, 15 B., Pag. 436, Taf. XXXI, Fig. 8, Taf. XXXIII, Fig. 39.
Phascolosoma Ørstedii, Keferstein.
Reisen nach d. Nordpolarmeer, 1870—71, v. M. Th. v. Heuglin, 3 Th., Pag. 246.

Kroppen cylindrisk, i Bagenden kort tilspidset, overalt besat med meget smaa, spredte, ikke fremragende Papiller, der danne ufuldkomne Tverrader, hvilke ere tydeligst paa den bagerste Del. Huden er fast, glat, perlemorglindsende, og under Loupen fint reticuleret. Snabelen udgjør omtrent $^3|_4$ Del af Kroppens Længde og er besat med lignende Papiller. Munden rund, omgiven med 3—4 Rader Tentakler, der ere conisk tilspidsede, hvidgule og omtrent 50 i Tallet. Nærmest Mundranden sidder paa hver Side en temmelig lang Tentakel, der paa Spidsen er forsynet med et rundt orangerødt Pigmentpunkt. Naar Dyret udstrækker Tentaklerne, danne disse i Begyndelsen en Conus, paa hvis Spidse de to Pigmentpletter ere iøinefaldende. Musculaturen stærk og bestaaende af et Lag Tver- og Længdefibre, der ikke danne Bundter. Den indre Flade af Kropshulheden er stærk perlemorglindsende. 4 Retractorer, hvoraf de ventrale udspringe i den midterste Trediedel af Kroppen (Fig. 43 vr), medens de dorsale udspringe langt derfra i den forreste Trediedel (Fig. 43 dr). Alle 4 forene sig henimod Spidsen af Snabelen. Ved Grunden af hver Bugretractor findes et tyndt, slangeformigt Organ, der indeholdt Æg i forskjellige Udviklingsstadier (Fig. 43 o). Nervestrengen af-

The organ of generation surrounds, in the form of lamellæ, nearly the whole of the spiral of the intestine, of which only the posterior part is not covered (fig. 45 g). The length of the animal with extended proboscis varies from 20—50 Mm. The color, dull greyish green, with a little darker brownish green papillæ.

Found in Finmark, Tromsø and Hammerfest, by M. Sars and Danielssen; in Nordland, Bodø, by G. O. Sars. It lives partly in empty shells, partly free, on sandy bottom, at the depth of 30—40 fathoms. On the coast of Norway it is rare, but seems to be rather common on the coast of Greenland; for the museum of Copenhagen has been supplied thence with many specimens.

As will be seen by the synonymia, we have put Kefersteins Ph. boreale together with Sars' eremita, which we consider ourselves justified in doing, after having had occasion to compare both Sars' and Kefersteins original specimens.

EXPLANATION OF THE FIGURES.

Tab. 15, fig. 45. Phascolosoma eremita opened. *g* organ of generation shewing the spiral of intestine; *o* serpentine organ; *n* nervous cord; *s, s* segmental organs; *r* retractors; *r*¹ retractors forming a sheath round the oesophagus *sp.*

PHASCOLOSOMA (SIPUNCULUS) MARGARITACEUM, M. Sars.

(Tab. 15, fig. 43—44).

Nyt Magazin for Naturvidenskaberne, 6 B. 1851, p. 196.
Homalosoma læve Ørsted (Mus. Hafn.)
Phascolosoma Ørstedii, Keferstein.
Nachricht d. k. Ges. d. Wissensch. Göttingen. 1863, p. 205.
Zeitschrift f. wiss. Zoologie, 15 B., p. 436, Taf. XXXI, fig. 8, Taf. XXXIII, fig. 39.
Phascolosoma Ørstedii, Keferstein.
Reisen nach d. Nordpolarmeer, 1870—71, v. M. Th. v. Heuglin, 3 Th., p. 246.

The body cylindrical, at the posterior extremity shortly tapered, everywhere covered with very small dispersed not prominent papillæ, which form imperfect, transverse rows most distinct in the posterior part. The skin is firm, smooth, shining like mother of pearl, and appears under the magnifying glass finely reticulated. The proboscis forms about $^3/_4$ of the length of the body, and is covered with similar papillæ. The mouth circular, surrounded with 3—4 rows of tentacles, which are conically tapered, whitish yellow and about 50 in number. Nearest to the mouth, there is on each side a rather long tentacle having on its extremity a round, orange-red pigmentary spot. When the animal extends its tentacles, they form at first a cone, on the apex of which the two pigmentary spots are conspicuous. The muscular system is strong, and consists of a layer of transverse and longitudinal fibres, which do not form fascicles. The interior surface of the perivisceral cavity is strongly lustrous like mother of pearl. 4 retractors: the ventral ones having their source in the middle third of the body (fig. 43 vr), and the dorsal retractors commencing, at a distance from this part, in the anterior third of the body (fig. 43 dr). All 4 unite themselves towards the extremity of the pro-

giver, som sædvanligt, en Mængde Grene, hvoraf de, der gaa til Spiserøret, ere de længste. Spiserøret meget langt og paa den forreste Del forsynet med et slangeformigt, contractilt Kar (Fig. 43 k). Tarmkanalen bestaar af en Mængde tæt til hinanden sluttende Vindinger, der bagtil ikke ere befæstede, hvorimod de paa Siderne have 3 Tilhæftninger; af disse er dog den, der befæster den 1ste Tarmslynge, den længste og stærkeste. Rectum er meget kort og ved mange Muskelfibre stærkt fæstet til Huden. Desforuden findes en rudimentær Spindelmuskel, der ophører paa 3die eller 4de Tarmslynge. Segmentalorganerne to, frie og tildels snoede. Generationsorganet tager sin Begyndelse ved den nederste Del af Spiserøret og omgiver næsten som en Kapsel hele Tarmspiralen (Fig. 43 g, g). Kropshulheden og de i den indesluttede Organer ere beklædte med Peritoneum.

Dyrets Længde 30—50 Mm., hvoraf omtr. 20—30 Mm. indtages af Snabelen. Farven blaalighvid eller perlegraa.

Findested: Lofoten, Tromsø, Komagfjord, Hammerfest, Grønland og Spitsbergen. Dybden: Sars angiver 30—40, ja indtil 300 Favne. Danielssen 30—60, sandig Bund.

Ogsaa for denne Arts Vedkommende have vi forskaffet os Originalexemplarer og derved forvisset os om, at Phascolosoma Ørstedii, Kef. ikke er nogen fra Sars's Phascolosoma margaritaceum forskjellig Art.

FORKLARING OVER FIGURERNE.

Tab. 15, Fig. 43. Phascolosoma margaritaceum, aabnet. *dr* Dorsalretractor; *vr* Ventralretractor; *g, g* Generationsorganet; *o* slangeformigt Organ; *k* contractilt Kar.

Fig. 44. Et Stykke af Æggestokken tilligemed sine Udkrængninger, der indeslutte Æg i forskjellige Udviklingsstadier.

PHASCOLOSOMA (SYRINX) HARVEII, Forb.

(Tab. 15, Fig. 41—42).

British Starfishes, Pag. 249.

Phascolosoma margaritaceum, Keferstein.

Nachricht. d. k. Ges. d. Wissensch. Gøttingen, 1865, Pag. 201.

Zeitschr. f. wiss. Zoologie, 15 B., Pag. 430, Taf. XXXI, Fig. 9, Taf. XXXII, Fig. 28, 29.

Sipunculus obscurus, Quatf. (fide Grube).

Histoire nat. des annelés marins et d'eau douce, Tom. 2, Pag. 216, Pl. 16, Fig. 16, 17.

Kroppen omtr. 40 Mm. lang, cylindrisk, næsten glat, besat med yderst smaa Papiller, der paa den conisk tilspidsede Bagende og ved Grunden af Snabelen ere mere sammentrængte og danne ligesom to brune Belter, som have et reticuleret Udseende. Huden svagt perlemorglindsende, blød og halv gjennemskinnende. Snabelen temmelig kort, omtrent af Kroppens Længde, forsynet med flere Rækker Tentakler; paa dens forreste Ende bagenfor Tentakelkrandsen en glat Ring, og nedenfor

boscis. At the basis of each ventral retractor, there is a thin serpentine organ containing ova in different stages of development (fig. 43 o). The nervous cord furnishes, as usual, a number of branches, of which those that go to the oesophagus are the longest. The gullet is very long, and on the anterior part provided with a serpentine, contractile vessel (fig. 43 k). The intestinal canal consists of a number of close-lying circumvolutions, which are not attached behind, but have on the sides 3 attachments, of which the longest and strongest is that which fastens the first circumvolution of the intestine. The rectum is very short, and strongly attached to the skin by many muscular fibres. Moreover there is a rudimentary fusiform muscle, which ceases at the 3rd. or 4th. circumvolution of the intestine. The segmental organs two, free and partly twisted. The organ of generation takes its beginning at the lower part of the oesophagus, and surrounds, nearly like a capsule, the whole intestinal spiral (fig. 43 g, g). The perivisceral cavity and the organs contained in it, are covered with the peritoneum.

The length of the animal 30—50 Mm. of which about 20—30 Mm. occupied hy the proboscis. The color bluish white or pearl-grey.

It is found at Lofoten, Tromsø, Komagfjord, Hammerfest, Greenland and Spitsbergen. The depth given by Sars is 30—40 and even up to 300 fathoms. Danielssen states 30—60, sandy bottom.

Also in respect to this species, we have procured original specimens, and thereby ascertained that Phascolosoma Ørstedii Kef. is not any different species from Sars's Phascolosoma margaritaceum.

EXPLANATION OF THE FIGURES.

Tab. 15, fig. 43. Phascolosoma margaritaceum, opened. *dr* dorsal retractors; *vr* ventral retractors; *g, g* organ of generation; *o* serpentine organ; *k* contractile vessel.

Fig. 44. A part of the ovary, together with its follicles containing ova in various stages of development.

PHASCOLOSOMA (SYRINX) HARVEII, Forb.

(Tab. 15, fig. 41—42.)

British Star-fishes, p. 249.

Phascolosoma margaritaceum, Keferstein.

Nachricht d. k. Ges. d. Wissensch. Göttingen, 1865, p. 201.

Zeitschrift f. wiss. Zoologie, 15 B., p. 430, Taf. XXXI, fig. 9, Taf. XXXII, fig. 28, 29.

Sipunculus obscurus, Quatf. (fide Grube).

Histoire nat. des annelés marins et d'eau douce. Tom. 2, p. 216, Pl. 16, fig. 16, 17.

The body about 40 Mm. long, cylindrical, nearly smooth, covered with extremely small papillæ, which on the conically tapered posterior end, and on the base of the proboscis, are more closely compressed, and form, as it were, two brown belts, which have a reticulated appearance. The skin is slightly lustrous like mother of pearl, soft and semi-transparent. The proboscis rather short, about the length of the body, having several rows of tentacles; on its anterior extremity, behind the ten-

denne en Ring med fine spredte Hager. Musculaturen bestaar af to tynde Muskellag, og Kroppens hele indre Flade er stærkt iriserende. 4 Retractorer, der ere temmelig smale og forene sig i Snabelens forreste Ende, idet de som en Skede omgive Spiserøret (Fig. 42 sp). Bugretractorerne tage deres Udspring omtr. fra Kroppens midterste Del med en lidt bred Basis, der er omgiven af et tyndt slangeformigt Organ (Fig. 42 o). Rygretractorerne udspringe paa den forreste Del af Kroppen. Spiserøret langt, ledsaget af et contractilt Kar (Fig. 42 k). Tarmen danner 14—16 Slyngninger, er forsynet med en Spindelmuskel, der tager sit Udspring lidt foran den korte Endetarm og gaar bagover for at fæste sig paa en af de sidste Tarmslynger; forresten har Spiserøret og den første Tarmslynge en særskilt tendinøs Befæstning. Segmentalorganerne temmelig lange og contractile. Nervestrengen som almindelig. Kropshulheden og de deri indeholdte Organer ere beklædte med Peritoneum.

Farven er varierende fra staalgraa med grønlige Belter til gulbrun, næsten brun med mørkere brune Belter.

Findested. Bergensfjord 5—10 Favne, Keferstein; 20—50 Favne, Koren. Sandig Bund, ikke sjelden.

Ved den engelske Kyst er den funden først af Mr. Harvey og ved den franske af Grube.

En af os, Koren, har længe før Keferstein fundet den her beskrevne Art; men antog den allerede dengang for at være Forbes's tidligere beskrevne Syrinx Harveii, med hvilken den ogsaa i det Væsentlige stemmer saa ganske overens, at vi ikke have taget i Betænkning at henføre Kefersteins margaritaceum som Synonym med Forbes's Art. Vi have tidligere gjort opmærksom paa, at Sars's Sipunculus margaritaceus er en fra Kefersteins meget forskjellig Art, idet denne, foruden andre Skjelnemærker, ogsaa er forsynet med Hager, hvilket ikke er Tilfældet med hin. Med Hensyn til den Phascolosoma margaritaceum, som Grube har fundet paa den franske Kyst, og som han henfører til Sars's Art, saa tro vi at kunne oplyse, at denne Art er Kefersteins margaritaceum, (Forbes's Syrinx Harveii), men ingenlunde Sars's, der efter alt at dømme tilhører de arctiske Have. Grube antager, at Quatrefages's Sipunculus obscurus ikke er andet end Phascolosoma margaritaceum, Keferstein; han har nemlig havt Anledning til at anstille Sammenligning i Pariser-museet.

FORKLARING OVER FIGURERNE.

Tab. 15, Fig 41. Phascolosoma Harveii, naturlig Størrelse.
Fig. 42. Samme aabnet. *k* contractilt Kar; *sp* Spiserør; *o* slangeformigt Organ.

tacular circlet a smooth ring, and below this a ring with fine dispersed hooks. The muscular system consists of two thin layers of muscles; and the whole interior surface of the body is strongly iridescent. 4 retractors, which are rather narrow and unite themselves in the anterior extremity of the proboscis, surrounding the oesophagus like a sheath (fig. 42 sp). The ventral retractors take their issue from about the middle part of the body, with a somewhat broad basis, which is surrounded by a thin serpentine organ (fig. 42 o). The dorsal retractors issue from the anterior part of the body. The oesophagus long, accompanied by a contractile vessel (fig. 42 k). The intestine forms 14—16 circumvolutions; it is provided with a fusiform muscle, which takes its issue a little in front of the short rectum, and goes backward, becoming attached to one of the last circumvolutions of the intestine. Moreover the oesophagus and the first circumvolution of the intestine have a separate tendinous attachment. The segmental organs, rather long and contractile. The nervous cord as usual. The perivisceral cavity and the organs contained in the same, are covered with the peritoneum.

The color is various; from steel-grey with greenish belts, to yellowishbrown, nearly brown with darker brown belts.

Found i the Bergensfjord 5—10 fathoms, Keferstein, 20—50 fathoms, Koren. On sandy bottom, not rare.

On the English coast it has been found first by Mr. Harvey, and on the French coast by Grube.

One of us, Koren, found the species here described long before Keferstein, but took it at that time to be Forbes's previously described Syrinx Harveii, with which in essential points it agrees so entirely, that we have not hesitated to class Keferstein's margaritaceum as synonymous with Forbes's species. We have previously noticed that Sars's Sipunculus margaritaceus is a very different species from Keferstein's; the latter being, besides other marks of distinction, furnished with hooks, which is not the case with the former. With respect to the Phascolosoma margaritaceum, which Grube has found on the French coast, and which he refers to Sars's species, we think that we are able to shew, that it is Keferstein's margaritaceum (Forbes's Syrinx Harveii) but by no means Sars's, which, judging from all things, we must consider as belonging to the arctic seas. Grube supposes that Quatrefage's Sipunculus obscurus is no other than Phascolosoma margaritaceum Keferst.; for he has had occasion to institute comparisons in the museum of Paris.

EXPLANATION OF THE FIGURES.

Tab. 15, fig. 41. Phascolosoma Harveii, natural size.
Fig. 42. The same opened. *k* the contractile vessel; *sp* oesophagus; *o* the serpentine organ.

PHASCOLOSOMA (SIPUNCULUS) PAPILLOSUM, Thomps.

(Tab. 15, Fig. 46).

Ann. & Magaz., vol. v, Pag. 101, 1840.

Syrinx papillosus, Forbes.

Brit. Starfish 1841, Pag. 247.

Phascolosoma papillosum, Dies.

Revis. d. Rhyngoden in l. c., Pag. 762, 1859.

Sipunculus papillosus, Qatref. l. c. II, Pag. 625, 1865.

Kroppen 80 Mm. lang, 15 Mm. bred, valseformig, endende bagtil i en liden Spids, tæt besat overalt med flade Papiller, der danne uregelmæssige Tverrader og forsynet med fine baade Længde- og Tverstriber. Saavel paa den bagre Ende som ved Grunden af Snabelen staa Papillerne meget tættere og ere noget større. Snabelen, 40 Mm. lang, er ligesom Kroppen besat med Papiller og forsynet med mange traadformige Tentakler. Analaabningen temmelig fremstaaende. Huden blød, og paa dens indre, mat perlemorglindsende Flade sees to tynde Muskellag, der ikke danne særskilte Bundter. 4 Retractorer, der fortil i Snabelen forene sig for ganske at omgive Spiserøret (Fig. 46 r). Bugretractorerne (Fig. 46 vr) udspringe paa den bagerste Del af Kroppens forreste Trediedel med en temmelig bred Basis, der er omgiven af et tyndt, slangeformigt Organ (Fig. 46 o). Rygretractorerne (Fig. 46 dr) udspringe omtr. i lige Linie med Analaabningen, altsaa paa Kroppens forreste Del, ligeledes med en bredere Basis. Segmentalorganerne frie, meget lange, dels blæreformigt udvidede, dels stærkt contraherede (Fig. 46 s, s). Spiserøret, der er noget smalt og ledsaget af et langt contractilt Kar (Fig. 46 k), gaar over i Tarmen, der danner en Mangfoldighed af Slyngninger (mellem 50—60), saa at den strækker sig lige til den bagerste Ende af Kropshulheden (Fig. 46 t, t). Endetarmen (Fig. 46 r^1) er yderst kort og med stærke Muskelknipper fæstet til Huden. Fra et af disse Knipper udspringer en Spindelmuskel (Fig. 46 sm), der løber ned igjennem nogle Tarmvindinger for at fæste sig paa den 4de eller 5te af disse. Den 1ste Tarmslynge, ligesom den nederste Del af Spiserøret, er befæstet ved en lang tendinøs Muskeltraad til Kropshulhedens Væg. Nervestrengen er tyk og løber imellem Retractorerne (Fig. 46 n). Saavel Kropshulheden, som de i denne indesluttede Organer, ere beklædte med Peritoneum.

Farven er rustbrun, noget mørkere ved den bagerste Ende og ved Grunden af Snabelen.

Vi have kun havt 2 Exemplarer til vor Raadighed, hvoraf det ene er fundet ved Askevold (Søndfjord), det andet i Bergensfjorden, — begge af samme Størrelse, paa 40—50 Favnes Dyb, sandig Bund. Den er ogsaa funden ved de britiske Øer af Thompson m. Flere.

FORKLARING OVER FIGURERNE.

Tab. 15, Fig. 46. Phascolosoma papillosum, aabnet, naturlig Størrelse. *dr* Dorsalretractorer; *vr* Ventralretractorer; *r* Skeden, som dannes ved de 4 Retractorers Sammensmel-

PHASCOLOSOMA (SIPUNCULUS) PAPILLOSUM, Thomps.

(Tab. 15, fig. 46).

Ann. & Magaz. vol. v, p. 101, 1840.

Syrinx papillosus, Forbes.

Brit. Star-fish 1841, p. 247.

Phascolosoma papillosum, Dies.

Revis. d. Rhyngoden in l. c., p. 762, 1859.

Sipunculus papillosus, Quatref. l. c. II, p. 625, 1865.

The body 80 Mm. long, 15 Mm. broad, cylindrical, terminating behind in a little point, everywhere densely covered with flat papillæ, which form irregular transverse rows, and striated both longitudinally and transversely. As well on the posterior extremity as at the base of the proboscis, the papillæ are much closer and somewhat larger. The proboscis, 40 Mm. long, is, like the body, covered with papillæ and furnished with a number of filiform tentacles. The anal-aperture rather prominent. The skin soft, and on its interior dull iridescent surface there appear two thin layers of muscles, which do not form separate fascicles. 4 retractors, which unite in front in the proboscis, entirely surrounding the gullet (fig. 46 r). The ventral retractors (fig. 46 vr) issue from the posterior part of the anterior third of the body, with a rather broad basis surrounded by a thin, serpentine organ (fig. 46 o). The dorsal retractors (fig. 46 dr) issue about in a straight line with the anal aperture, that is, on the anterior part of the body, likewise with a broader basis. The segmental organs free, very long, partly enlarged bladder-like, partly strongly contracted (fig. 46 s, s). The oesophagus, which is very narrow and accompanied by a long contractile vessel (fig. 46 k), goes over into the intestine forming a multitude of circumvolutions (between 50—60); so that it extends quite to the posterior end of the perivisceral cavity (fig. 46 t, t). The rectum (fig. 46 r^1) is extremely short, and attached by strong fascicles of muscles to the skin. From one of these fascicles, there issues a fusiform muscle (fig. 46 sm) which runs down through some of the circumvolutions of the intestine, and attaches itself to the 4th or 5th. The 1st circumvolution of the intestine, as also the lowest part of the oesophagus, is attached, by a long tendinous muscular filament, to the wall of the perivisceral cavity. The nervous cord is thick, and runs between the retractors (fig. 46 n). The perivisceral cavity and the organs inclosed in it, are covered with the peritoneum.

The color is ferruginous brown, somewhat darker at the posterior extremity and at the base of the proboscis.

We have only had 2 specimens at our disposal, one of which was found at Askevold (Søndfjord), the other in the Bergensfjord — both of same size — in 40—50 fathoms, sandy bottom. It has also been found near the British islands by Thompson and others.

EXPLANATION OF THE FIGURES.

Tab. 15, fig. 46. Phascolosoma papillosum, opened, natural size. *dr* dorsal retractors; *vr* ventral retractors; *r* sheath formed by the coalescence of the 4 retractors; r^1 Rectum; *sm*

ten; r^1 Rectum; *sm* Spindelmuskel; *k* contractilt Kar; *o* slangeformigt Organ; *n* Nervestreng; *t, t* Tarmspiral; *s, s* Segmentalorganer.

PHASCOLOSOMA (SIPUNCULUS) VULGARE, Blainville.

Dict. des Sc. nat. 49, 1827, Pag. 312, 313. Atlas, Vers, Pl. 33, Fig. 3, 3.

Phascolosoma vulgare, Diesing.

Syst. helminth. II, 1851, Pag. 65.

Phascolosoma vulgare, Keferstein.

Zeitschrift f. wiss. Zoologie, XII, Pag. 39, Taf. 3, Fig. 3.

Phascolosoma elongatum, Keferstein.

Zeitschrift. f. wiss. Zoologie XII, Pag. 39, Taf. 3, Fig. 5, 14, Taf. 4, Fig. 2—6.

Sipunculus elongatus, Quatref. l. c. II, Pag. 619, 1865.

Kroppen omtr. 60 Mm. lang, valseformig, noget conisk tilspidset i dens bagerste Ende, og besat med temmelig smaa Papiller, der paa den forreste Del og ved Grunden af Snabelen samt paa den bagerste Ende staa meget tættere sammen, ere noget større, og danne et mørkere farvet Belte. Snabelen indtager omtrent Kroppens halve Længde, er forsynet med lignende Papiller, og paa dens forreste, noget opsvulmede Del sees 8—10 Ringe med hornagtige Hager, der ere lidt krumbøiede. Paa Snabelen en Krands traadformige Tentakler, omtr. 16 i Antal. Huden temmelig fast; paa dens indvendige Flade, der er gulhvid, stærkt iriserende, sees de almindelige to Muskellag, der ere temmelig tynde. 4 Retractorer, hvoraf Bugretractorerne ere de længste og udspringe paa Grændsen af den forreste og midterste Trediedel af Kroppen med en noget bredere Basis, hvorom et tyndt hvidagtigt Organ slynger sig. Rygretractorerne ere meget kortere og udspringe fra Kropshulhedens forreste Del. Fortil i Snabelen forene de sig og omgive Spiserøret. Dette er noget kort, og ledsaget af det contractile, slangeformige Kar, der er temmelig tykt og af en hvid Farve. Tarmen er meget lang, danner omkring 50 Slyngninger, og naar lige til Bunden af Kropshulheden. Den første Slynge, ligesom Spiserøret, er befæstet ved flere tendinøse Muskeltraade. Endetarmen kort, og dens yderste Ende fastheftet til Kropsvæggen ved mange tendinøse Traade. Strax foran Endetarmen udspringer en Spindelmuskel, der følger denne, gaar et Stykke bagover indeni Tarmspiralen og fæster sig paa Kropsvæggen. Segmentalorganerne frie, meget lange og stærkt contraherede. Generationsorganet tilheftet Tarmen, hvis Slyngninger det ganske omslutter i en stor Udstrækning, indeholdende en Masse Æg, hvoraf mange løse ogsaa fandtes i Kropshulheden. Nervestrengen løber imellem begge Bugretractorernes Grunddel, og afgiver de sædvanlige Grene til Hud, Spiserør og Tarm.

fusiform muscle; *k* contractile vessel; *o* serpentine organ; *n* nervous cord; *t, t* spiral of intestine; *s, s* segmental organs.

PHASCOLOSOMA (SIPUNCULUS) VULGARE, Blainville.

Dict. des. sc. nat. 49, 1827, p. 312, 313. Atlas, Vers, Pl. 33, fig. 3, 3.

Phascolosoma vulgare, Diesing.

Syst. helminth 11, 1851, p. 65.

Phascolosoma vulgare, Keferstein.

Zeitschrift f. wiss. Zoologie, XII, pag. 39, Taf. 3, fig. 3.

Phascolosoma elongatum, Keferstein.

Zeitschr. f. wiss. Zoologie XII, p. 39, Taf. 3, fig. 5, 14, Taf. 4, fig. 2—6.

Sipunculus elongatus, Quatref. l. c. II, p. 619, 1865.

The body about 60 Mm. long, cylindrical, somewhat conically tapered at its posterior extremity, and covered with rather small papillæ, which, on the foremost part and on the basis of the proboscis, as also on the hindermost part, stand much more closely together, are somewhat larger, and form a darker colored belt. The proboscis occupies about half the length of the body, is covered with similar papillæ, and on its anterior, somewhat enlarged part, has 8—10 rings with horny hooks which are a little bent. On the extremity of the proboscis, a circlet of filiform tentacles, about 16 in number. The skin rather firm; on its interior surface, which is yellowish white, and strongly iridescent, there appear the usual two layers of muscles which are rather thin. 4 retractors, of which the ventral retractors are the longest and issue from the limits of the anterior and middle thirds of the body, with a somewhat broader basis, round which a thin whitish organ entwines itself. The dorsal retractors are much shorter, and issue from the foremost part of the perivisceral cavity. They unite themselves in front in the proboscis, and go round the oesophagus. The latter is somewhat short and accompanied by the contractile serpentine vessel, which is rather thick and of a white color. The intestine is very long, forms about 50 circumvolutions, and extends quite to the bottom of the perivisceral cavity. The first circumvolution and the gullet are attached by several tendinous muscular filaments. The rectum is short, and its exterior end fixed to the wall of the body by many tendinous filaments. Immediately in front of the rectum, there issues a fusiform muscle, which accompanies it, goes some distance backward inside of the intestinal spiral and attaches itself to the wall of the body. The segmental organs free, very long and strongly contracted. The organ of generation is attached to the intestine, the circumvolutions of which it encloses entirely to a great extent, and contains a multitude of ova, of which many were also found loose in the perivisceral cavity. The nervous cord runs between the bases of both the ventral retractors, and furnishes the usual branches to the skin, the oesophagus and the intestine.

Kropshulheden og de deri indesluttede Organer ere beklædte med Peritoneum.

Farven er svag gulbrun med et mørkere brunt Belte omkring Grunden af Snabelen og Kroppens bagerste Ende.

Funden i Korsfjorden og Bergensfjorden paa omtrent 50—100 Favnes Dyb, sandig Bund; sjelden. Ved den franske Kyst skal den være temmelig almindelig i Stranden.

Som det sees af ovenstaaende Synonymi, have vi slaaet Phascolosoma elongatum, Keferst. sammen med Ph. vulgare, Blainville; thi ved Sammenholden af Beskrivelserne har det ikke været os muligt at finde et eneste Mærke, der skulde kunne adskille dem. Keferstein selv yttrer ogsaa, at det nok er muligt, at hans Ph. elongatum er den samme som Blainvilles Ph. vulgare, og det eneste Skjelnemærke, han angiver for sin Art, nemlig Mangelen af det brunsorte Belte paa Kroppens bagerste Ende, er ikke engang altid tilstede; thi, siger han, blandt de mangfoldige Exemplarer af Ph. elongatum, der have staaet til hans Disposition, fandt han nogle, der vare forsynede med Beltet. Men selv om dette virkelig havde manglet, var det dog neppe tilstrækkeligt til deraf at grunde en ny Art.

PHASCOLOSOMA (SIPUNCULUS) STROMBI, Montagu.

Phascolosoma Strombi, Keferstein.

Zeitschrift f. wiss. Zoologie, 15 B., Pag. 430, Taf. XXXI, Fig. 10, Taf XXXIII, Fig. 34, 35, 36.

Kefersteins Beskrivelse er saa fuldstændig, at vi kunne henvise til den. Der er imidlertid ingen af de os bekjendte Phascolosomaer, der variere saameget som netop denne Art. Stundom er Kroppen glat, Papillerne yderst smaa, og paa Snabelen mangler Hager; stundom ere Papillerne temmelig store, og paa Kroppen findes ingen Hager, men vel paa Snabelen; men hyppigst er det dog, at Kroppens Hud er glat, forsynet med smaa Papiller samt et Belte af Hager, og at den øverste Ende af Snabelen har 4—6 Ringe med Hager.

Den er almindelig overalt paa sandig Bund langs hele Kysten lige til Vadsø, paa en Dybde fra 20—100 Favne.

PHASCOLOSOMA STROMBI VARIETAS CAPITATUM. (SIPUNCULUS CAPITATUS, Rathke).

Nov. Act. Acad. Leop. Carol., XX, p. I, 1844, Pag. 143—147, Taf. VI, Fig. 20—23.

Den forekommer paa samme Localiteter som den foregaaende, men sjeldnere.

The perivisceral cavity and the organs contained in it, are clothed with the peritoneum.

The color is slightly yellowish brown, with a darker brown belt round the base of the proboscis and the posterior end of the body.

Found in the Korsfjord and Bergensfjord at the depth of about 50—100 fathoms, in sandy bottom, rare. On the French coast it is said to be rather common on the beach.

As will appear from the above synonymy, we have placed the Phascolosoma elongatum Keferstein together with Phasc. vulgare Blainville; for, on comparing the descriptions, we have not been able to find a single feature by which they might be distinguished. Keferstein himself states also that it is very possible his Ph. elongatum is the same as Blainville's Ph. vulgare; and the only mark of distinction which he indicates for his species, namely absence of the brownish black belt on the posterior end of the body, is not even always to be observed; for he says that among the many specimens of Ph. elongatum which he has had at his disposal, he found some which had the belt. But even if this belt had really been absent, it would have been scarcely sufficient to justify the establishment of a new species.

PHASCOLOSOMA (SIPUNCULUS) STROMBI, Montagu.

Phascolosoma Strombi, Keferstein.

Zeitsch. f. wiss. Zoologie, 15 B., p. 430, Taf. XXXI, fig. 10, Taf. XXXIII, fig. 34, 35, 36.

Kefersteins description is so complete that we may refer to it. There is however none of the so-called Phascolosomas that varies so much as this particular species. Sometimes the body is smooth, the papillæ extremely small, and without hooks on the proboscis; sometimes the papillæ are rather large, and no hooks are to be found on the body but only on the proboscis; most frequently however the skin of the body is smooth, covered with small papillæ, and has a belt of hooks, and the upper extremity of the proboscis has 4—6 rings with hooks.

It is common everywhere on sandy bottom along the whole coast right up to Vadsø, at the depth of from 20—100 fathoms.

PHASCOLOSOMA STROMBI VARIETAS CAPITATUM. (SIPUNCULUS CAPITATUS, Rathke).

Nov. Act. Acad. Leop. Carol., XX, p. I, 1844, p. 143—147, Taf. VI, fig. 20—23.

It is found in the same localities as the preceding, but more rarely.

PHASCOLOSOMA STROMBI VARIETAS VERRUCOSUM, Nobis.

Kroppen cylindrisk, omtr. 20 Mm. lang; den bagerste Ende afstumpet og overalt besat med store conisk tilspidsede Papiller, der ved Grunden af Snabelen og den bagerste Kropsende ere end større og staa tættere sammen. Snabelen omtrent saa lang som Kroppen, paa dens forreste Ende forsynet med 6—8 Ringe med korte, afstumpede Hager. Tentaklerne omkring 20. Huden halvgjennemsigtig. Den indre Bygning svarer i det Væsentlige til Hovedformen med Undtagelse af, at de to Retractorer ikke udspringe ganske i Kropsbunden, men nogle Mm. længere fortil.

Farven varierer meget, dels gulhvid, dels svag gulgrøn med et mørkegrønt Belte paa den bagerste Ende og ved Grunden af Snabelen. Fundet i Korsfjorden og Bergensfjorden, tildels i Dentalium entale paa sandig Bund, 100—200 Favnes Dyb. G. O. Sars har fundet den i Hardangerfjorden.

ONCHNESOMA,[1]) Nobis.

SLÆGTSCHARACTER.

Kroppen liden, pæreformig. Snabelen lang. Analaabningen lidt foran Snabelens Grund. Ingen Tentakler. Intet Karsystem. En Retractor.

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[1]) Denne af os opstillede Slægt, der er dannet af *"ογχνη*, Pære, *σῶμα*, Legeme, nærmer sig Grubes Anoplosomatum; men det maa være os tilladt at bemærke, at Grubes Slægt, der er beskrevet efter et i Spiritus mindre godt conserveret Exemplar, er saa svævende i sine Charactermærker, at vi ikke have kunnet henføre Onchnesoma til den. Imidlertid forekommer det os, at Grubes Slægt Anoplosomatum er fuldstændig misforstaaet af flere senere Forfattere, saasom Keferstein, Diesing, Quatrefages, idet de iblandt Slægtscharactererne angive en „Terminalanus." Grube siger udtrykkelig: „Anus ender i Sidevæggen, noget foran Dyrets bagerste Ende," der er forsynet med en Porus, som fører ind i Kropshulheden. Denne Porus er det, hine Forfattere have kaldt Analaabning; men Grube har aldrig benævnt den saaledes. Det er ikke alene Slægten Anoplosomatum, der er tvivlsom, men ogsaa enkelte af de opførte Arter ere meget usikkre, som f. Ex. Kefersteins Anopl. antillense, Steenstrup. Denne Art er ifølge Meddelelser fra Dr. Lütken ingen Gephyré; men uden al Tvivl Polyperne af Physalia Arethusa. Lütken udtrykker sig saaledes: „Det er ganske rigtigt, at Glasset med disse Skabninger i sin Tid er sendt Keferstein tilligemed det øvrige sipunculuslignende Materiale under hint Navn Anoplosomatum antillense, hvorunder det henlaa i Samlingen; men dette Navn hidrører ialfald ikke fra Steenstrup, — fra hvem er det ikke muligt at oplyse, da vore Sipunculider i Tidens Løb ere blevne undersøgte af mange, der have noteret deres Bestemmelser paa Etiketterne."

PHASCOLOSOMA STROMBI VARIETAS VERRUCOSUM, Nobis.

The body cylindrical, about 20 Mm. long; the posterior end truncated, and everywhere covered with large, conically tapered papillæ, which at the base of the proboscis and at the posterior end of the body, are still larger and stand more closely together. The proboscis, about as long as the body, has on its anterior extremity 6—8 rings of short obtuse hooks. The tentacles about 20. The skin semi-transparent. The interior structure corresponds in essential points to that of the main form, with the exception that the two retractors do not issue quite from the end of the body, but a few Mm. further forward.

The color varies considerably: it is sometimes yellowish white, sometimes light yellowish green, with a dark green belt on the posterior end, and at the base of the proboscis. Found in the Korsfjord and in the Bergensfjord, sometimes in Dentalium entale on sandy bottom, at the depth of 100—200 fathoms. G. O. Sars has found it in the Hardangerfjord.

ONCHNESOMA,[1]) Nobis.

GENERIC CHARACTERISTICS.

The body small, pear-shaped. The proboscis long. The anal aperture a little in front of the base of the proboscis. No tentacles; no vascular system. One retractor.

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[1]) This genus established by us, is named from *"ογχνη*, Pear, and *σῶμα*, body; it resembles Grube's Anoplosomatum; but we must be allowed to remark, that Grube's genus, which is described according to a specimen not very well preserved in spirit, is so vague in its characteristics, that we have not been able to class the Onchnesoma in it. However it appears to us that Grube's genus Anoplosomatum has been completely misunderstood by several later authors, as for instance Keferstein, Diesing, Quatrefages; for they mention among the generic characteristics, a „terminal anus." Grube says expressly: „The anus terminates in the side-wall somewhat in front of the posterior extremity of the animal, which has a porus leading into the perivisceral cavity," It is this porus which the said authors have called an anal aperture; but Grube has never given it that name. It is not only the genus Anoplosomatum, which is doubtful, but also some of the species mentioned are very uncertain, as for instance Kefersteins Anopl. antillense, Steenstrup. This species is according to communications from Dr. Lütken no Gephyrea, but without any doubt the polyps of Physalia Arethusa. Lütken expresses himself thus: „It is quite true that the glass with these creatures was sent at the time to Keferstein, together with the other preserved things of sipuncular nature, under that name Anoplosomatum antillense, which it bore in the collection; but the name does not in any case come from Steenstrup, — from whom it is not possible to ascertain; as our Sipunculides have been in the course of time examined by many who have noted their name on the labels."

ONCHNESOMA STEENSTRUPII, Nobis.

(Tab. 15, Fig. 28—36).

Sipunculus pyriformis, Danielssen.

Videnskabsselskabets Forhandlinger i Christiania, Aaret 1859, Pag. 251.

Phascolosoma pusillum, M. Sars.

Videnskabsselskabets Forhandlinger, Aaret 1868, benævnt, men ikke beskrevet.

Sipunculus aus Kilmore? Claparède.

Müllers Archiv f. Anatomie u. Physiologie, Jahrgang 1861, P. 540.

Kroppen, 3 Mm. lang, 2 Mm. tyk, er pæreformig, overalt besat med smaa coniske Papiller (Tab. 15, Fig. 30 p), ender bagtil i en liden Spids, og viser under stærk Loupeforstørrelse et netformigt Udseende. Snabelen er yderst tynd og lang, i fuldkommen udstrakt Tilstand indtil 34 Mm., besat med meget fine Papiller, der ere stillede i regelmæssige Tverrækker og ophøre ganske omtr. 2 Mm. fra Mundaabningen. Denne er rund og forsynet med meget smaa bløde Fremstaaenheder (Fig. 30′ o), der dannes af Cylinderepithelet, som beklæder den indre Flade af Spiserøret; der er forresten ingen Tentakler. Huden er temmelig fast, og, naar Snabelen er udstrakt, saameget gjennemsigtig, at de indre Organer kunne sees, men dog meget utydeligt; dens indre Flade beklædt med det for Phascolosomaerne almindelige Lag af sammenhængende Ring- og Længdemuskler, hvilke ere meget tynde. Epithellaget dannes af meget store Celler, der indeholde foruden Kjerner en Mængde grønligt Pigment (Fig. 33), der giver Huden sin særegne fine grønlige Farve. Kun én Retractor, der tager sit Udspring fra Kropshulhedens bagerste Ende med en bred Grunddel, og gaar saa i Midten af Legemet og Snabelen som en rund Søile lige hen til Mundaabningen, omkring hvilken den fæster sig (Fig. 30 r, r, r, r). Spiserøret, der er meget langt og smalt, følger Retractor et Stykke ned i Kropshulheden (Fig. 30 sp, sp, sp), hvor det da gaar over i Tarmen (Fig. 30 t, t), der danner en Mængde løse Slyngninger paa venstre Side af Retractor, hvilke gaa næsten henimod den bagerste Ende; herfra gaar den igjen et langt Stykke forover, bøier saa bagover for atter at gaa fortil over Retractor og kommer nu paa høire Side af denne (Fig. 30 t^1), hvor den danner dels enkelte Bugtninger, der ved fine Traade ere fæstede til Kropshulheden, dels spiralformige Slyngninger (Fig. 30 t^2), der endelig gaa over i en lang, næsten lige Endetarm, der munder ud paa Snabelen lidt ovenfor dennes Grunddel (Fig. 30 re, re). Segmentalorganet danner en langstrakt, klar Blære, hvis frithængende Ende er conisk tilspidset (Fig. 30 s). I Kropshulheden findes hyppig en Mængde løse Æg. Nervestrengen tager sin Begyndelse ved Retractorens Basaldel, løber langs Kroppens og Snabelens indre Flade mod Spiserørets forreste Ende, hvor den, som hos Sipunculiderne i Almindelighed, danner en Ring (Fig. 30 n, n, n). Kropshulheden og samtlige deri indeholdte Organer ere beklædte med Peritoneum.

ONCHNESOMA STEENSTRUPII, Nobis.

(Tab. 15, fig. 28—36.)

Sipunculus pyriformis, Danielssen.

Videnskabsselskabets Forhandlinger i Christiania, Aaret 1859, pag. 251.

Phascolosoma pusillum, M. Sars.

Videnskabsselskabets Forhandlinger, Aaret 1868, named but not described.

Sipunculus aus Kilmore? Claparède.

Müllers Archiv f. Anatomie u. Physiologie, Jahrgang 1861, p. 540.

The body 3 Mm. long, 2 Mm. thick, pear-shaped, everywhere covered with small conical papillæ (Tab. 15, fig. 30 p), terminates behind in a little point, and shews under a strong magnifying glass a reticulated appearance. The proboscis is extremely thin and long, and when completely extended measures up to 34 Mm.; it is covered with very fine papillæ, which are situated in regular transverse rows and cease entirely about 2 Mm. from the oral aperture. The latter is round and furnished with very small soft prominences (fig. 30′ o), formed by the cylindrical epithelium which covers the interior surface of the oesophagus; there are otherwise no tentacles. The skin is rather firm and, when the proboscis is extended, so far transparent that the interior organs may be seen, but still very indistinctly; its interior surface is covered with the usual layer of connected annular and longitudinal muscles, which are very thin. The layer of epithelium is formed of very large cells, containing, besides nuclei, a quantity of greenish pigment (fig. 33), which gives to the skin its peculiar fine greenish color. Only one retractor, which takes its issue from the hindermost end of the perivisceral cavity with a broad base, and then goes in the middle of the body and of the proboscis, like a round column, right on to the oral aperture, round which it is inserted (fig. 30 r, r, r, r). The oesophagus, which is very long and narrow, accompanies the retractor some way down into the perivisceral cavity (fig. 30 sp, sp, sp), where it goes over into the intestine (fig. 30 t, t), which forms a number of loose circumvolutions on the left side of the retractor, extending nearly to the posterior end; hence the intestine goes again forward to a considerable distance, then bends backward, and again goes forward over the retractor coming now on the right side (fig. 30 t^1), where it forms sometimes a few bends, which are attached by fine filaments to the perivisceral cavity; sometimes spiral circumvolutions (fig. 30 t^2) which finally go over into a long nearly straight rectum, which has its aperture on the proboscis a little above its base (fig. 30 re, re). The segmental organ forms an elongated clear bladder, the freely pendant extremity of which is conically tapered (fig. 30 s). In the perivisceral cavity there are frequently a number of loose ova. The nervous cord takes its beginning at the basal part of the retractor, and runs along the interior surface of the body and proboscis towards the anterior extremity of the oesophagus, where, as in the Sipunculides, it usually forms a ring (fig. 30 n, n, n). The perivisceral cavity and all the organs contained therein covered with the peritoneum.

De mikroskopiske Undersøgelser af denne Art have vi omtalt i den generelle Del, hvortil vi maa henvise.

Den umaadelig lange Snabel kan fuldstændig indtrækkes i Kroppen, og da faar denne et næsten kugleformigt Udseende (Fig. 29).

Farven svagt lysegrøn med nogen Perlemorglands. Funden i Moldefjord og ved Christiansund paa 30—50 Favne, lerholdig Bund. I Bergensfjord, Hardangerfjord og Søndfjord gaar den ned til 300 Favne. Naar man kommer ned paa de større Dyb og træffer lerholdig Bund, findes den meget hyppig paa en lang Strækning af Vestkysten.

ARTSCHARACTEREN.

Kroppen 3 Mm. lang, 2 Mm. bred, svagt lysegrøn med et netformigt Udseende, og besat med smaa coniske Papiller. Snabelen omtrent 12 Gange saa lang som Kroppen, forsynet med Papiller siddende i Tverrækker. En Retractor.

FORKLARING OVER FIGURERNE.

Tab. 15, Fig. 28. Onchnesoma Steenstrupii i naturlig Størrelse.
Fig. 29. Snabelen indtrukken i Kroppen, naturlig Størrelse.
Fig. 30. O. Steenstrupii, aabnet og forstørret. *n, n, n* Nervestrengen; *o* de bløde Papiller om Mundaabningen; *p, p* Hudpapiller. For at fremstille disse er et lidet Stykke af Snabelen ikke aabnet. *r, r, r, r* Retractor; *re, re* Rectum; *s* Segmentalorganet; *sp, sp, sp* Spiserøret; *t, t* løse Tarmslynger; t^1 Tarmslynge paa høire Side af Retractor; t^2 spiralformige Slyngninger.
Fig. 30′. Den øverste Del af Snabelen, forstørret. Paa Grund af Snabelens overordentlige Længde er en Del af den borttaget.
Fig. 31. Hudpapiller paa Snabelen, forstørret.
Fig. 32. Hudpapiller paa den bagerste Del af Kroppen, stærkt forstørret.
Fig. 33. Pigmentceller.
Fig. 34. Gjennemsnit af Snabelen af en levende Onchnesoma Steenstrupii, 300 Gange forstørret. *a, a, a* Cuticularfortykkelser med kornet Pigment; *k* Kjertelmunding; *c* Cuticula; *r* Ringmuskler; *l* Længdemuskler; *p* Parietalperitoneum med flimrende Celler; p^1 Visceralperitoneum med lignende Celler; *spe* Spiserørepithel; b^1 kornet Blodlegeme; b^2 homogene, svagt gulrødlige Blodlegemer.
Fig. 35. Et Stykke af Nervestrengen i Snabelen af O. Steenstrupii med centralt beliggende Nerveceller, 600 Gange forstørret. *a* Nerveceller; *g* Ganglier.
Fig. 36. Et Hudlegeme med Nervetraad fra den nedre Del af Snabelen af en svagt levende O. Steenstrupii. 300 Gange forstørret.

ONCHNESOMA SARSII, Nobis.

(Tab. 15, Fig. 37—40.)

Phascolosoma lævissimum, Sars.

Nævnt af M. Sars i Videnskabsselskabets Forhandlinger, Christiania, 1868, Pag. 252.

Kroppen kølleformig, 8 Mm. lang, besat med yderst smaa spidse Papiller, der først blive synlige under stærk

The microscopic investigations of this species have been considered in the general notice to which we refer.

The enormously long proboscis can be completely retracted into the body; and then the latter acquires a nearly globular appearance (fig. 29).

The color pale lightgreen, with some lustre of mother of pearl. Found in the Moldefjord and at Christiansund in 30—50 fathoms; argilliferous clayey bottom. In the Bergensfjord, Hardangerfjord and Søndfjord it goes down to 300 fathoms. When we come to clayey bottom in the great depths, it is found very frequently on a long tract of the west coast.

SPECIFIC CHARACTERISTICS.

The body 3 Mm. long, 2 Mm. broad, pale light green, with a reticulated appearance, and covered with small conical papillæ. The proboscis about 12 times as long as the body, with papillæ situated in transverse rows One retractor.

EXPLANATION OF THE FIGURES.

Tab. 15, fig. 28. Onchnesoma Steenstrupii, natural size.
Fig. 29. Proboscis retracted into the body, natural size.
Fig. 30. O. Steenstrupii, opened, magnified. *n, n, n* nervous cord; *o* the soft papillæ over the oral aperture; *p, p* the skin papillæ. In order to shew these, a small part of the proboscis is not opened. *r, r, r, r* retractor; *re, re* rectum; *s* segmental organs; *sp, sp, sp* oesophagus; *t, t* loose circumvolutions of intestine; t^1 circumvolution of intestine on the right side of retractor; t^2 spiral circumvolutions.
Fig. 30′. The upper part of the proboscis, magnified. On account of the extraordinary length of the proboscis a part is removed.
Fig. 31. The skin papillæ on the proboscis, magnified.
Fig. 32. The skin papillæ on the posterior part of the body, strongly magnified.
Fig. 33. Pigment cells.
Fig. 34. Section of the proboscis of a living Onchnesoma Steenstrupii, magnified 300 times. *a, a, a* cuticular incrassations with granulated pigment; *k* gland opening; *c* cuticula; *r* annular muscles; *l* longitudinal muscles; *p* parietal peritoneum with ciliated cells; p^1 visceral peritoneum with similar cells; *spe* epithelium (oesophagus); b^1 granulated blood globules; b^2 homogeneous, slightly yellowish red blood globules.
Fig. 35. Part of the nervous cord in the proboscis of O. Steenstrupii, with nerve-cells situated in the centre, magnified 600 times. *a* nerve cells; *g* ganglia.
Fig. 36. A cuticular body with a nervous filament from the lower part of the proboscis of an O. Steenstrupii, that was not quite dead, magnified 300 times.

ONCHNESOMA SARSII, Nobis.

(Tab. 15, fig. 37—40).

Phascolosoma lævissimum, Sars.

Named by M. Sars in Videnskabsselskabets Forhandlinger, Christiania 1868, p. 252.

The body claviform 8 Mm. long, covered with extremely small pointed papillæ, which are not visible unless

Loupeforstørrelse. Snabelen, der er omtrent 2 Mm. lang, forsynet med Papiller, der ere lidt større og staa meget tættere end de paa Kroppen (Fig. 39 p), ender med en oval knapformig Udbredning, paa hvis midterste Del findes en rund, lidt foldet Mundaabning (Fig. 39 o). Huden glindsende, gjennemsigtig, temmelig tynd, men fast, har paa sin indre Flade to tynde Muskellag, uden at særskilte Muskelbundter dannes. En Retractor, der tager sit Udspring med en lidt bredere Basis paa den bagerste Fjerdedel af Kropsvæggen, omtrent 2 Mm. fra Bunden, følger Bugfladen langs hele Snabelen indtil dennes forreste Ende, hvor den indsererer sig. Spiserøret, der er langt og meget smalt, følger Retractor næsten henimod Midten af Kroppen, hvor det gjør en Bøining (Fig. 40 sp, sp) for at gaa over i Tarmen, som strax danner et Par langstrakte løse Slyngninger (Fig 40 t), der gaa over i mange, tætte spiralformige Vindinger (Fig. 40 ts), som tabe sig i en lang Endetarm, der udmunder paa Snabelen lidt foran dens Grunddel (Fig. 40 re, re). Tarmspiralen er ikke befæstet i dens bagerste Ende, men vel paa dens midterste Del med en enkelt tendinøs Traad. Segmentalorganet frit, ikke meget langt (Fig. 40 s). Nervestrengen temmelig tyk. Kropshulheden og de deri indesluttede Organer beklædte med Peritoneum.

Farven er grønlig. Funden af G. O. Sars ved Skraaven, Lofoten, 200—300 Favnes Dyb.

Afdøde Professor M. Sars har benævnt denne Art Phascolosoma lævissimum, uden dog at beskrive den. Da der allerede existerer en Phascolosoma læve, og den desuden virkelig har Papiller, have vi, for at undgaa Misforstaaelse, givet den Navn efter vor afdøde Medarbeider og Ven.

ARTSCHARACTEREN.

Kroppen 8 Mm. lang, kølleformig, glindsende, grønlig, med yderst smaa, adspredte Papiller. Snabelen lidt længere end Kroppen, forsynet med Papiller, fortil endende knapformig. Retractoren udspringer et Par Millimeter fra Kropsenden.

FORKLARING OVER FIGURERNE.

Tab. 15, Fig. 37. Onchnesoma Sarsii, lidt forstørret.
Fig 38. Stærkere forstørret.
Fig. 39. Den øverste Del af Snabelen, forstørret. *o* bløde Papiller om Mundaabningen; *p* Papiller paa Snabelens øverste Del.
Fig. 40. O. Sarsii, aabnet og forstørret. *r, r* Retractor; *re, re* Rectum; *s* Segmentalorgan; *sp, sp* Spiserøret; *t* Tarm; *ts* Tarmspiral; *n* Nervestreng.

under a strong magnifying glass. The proboscis about 2 Mm. long, covered with papillæ, which are a little larger, and which stand more closely together than those of the body (fig. 39 p), terminates in an oval button-shaped enlargement, on the middle part of which there is a round slightly folded oral aperture (fig. 39 o). The skin is shining transparent, rather thin but firm, having on its inner surface two thin layers of muscles, without any separate fascicles of muscles being formed. One retractor, which takes its beginning with a rather broader basis, from the posterior fourth part of the wall of the body, 2 Mm. from the bottom, follows the ventral surface along the whole proboscis up to the anterior extremity of the same, where it is inserted on the oesophagus, which is long and very narrow accompanying the retractor nearly to the middle of the body, where it makes a bend (fig. 40 sp, sp), going over into the intestine, which immediately forms a couple of elongated loose slings (fig. 40 t), which go over into many close spiral windings (fig. 40 ts) which lose themselves in a long rectum, which has its aperture on the proboscis a little in front of the base (fig. 40 re, re). The intestinal spiral is not attached at its posterior extremity, but in its middle part by a single tendinous filament. The segmental organ free, not very long (fig. 40 s). The nervous cord rather thick. The perivisceral cavity and the organs therein contained, covered with the peritoneum.

The color is greenish. Found by G. O. Sars at Skraaven, Lofoten at 200—300 fathoms' depth.

The late Professor M. Sars has called this species Phascolosoma lævissimum, without however describing it. As there already exists a Phascolosoma læve, and as it moreover really has papillæ, we have in order to avoid misunderstanding given it the name of our deceased colleague and friend.

SPECIFIC CHARACTERISTICS.

The body 8 Mm. long, claviform, shining, greenish, with extremely small dispersed papillæ. The proboscis a little longer than the body, covered with papillæ, terminating in front, with a button-shaped extremity. The retractor begins a few millimetres from the extremity of the body.

EXPLANATION OF THE FIGURES.

Tab. 15, fig. 37. Onchnesoma Sarsii, slightly magnified.
Fig. 38. More strongly magnified.
Fig. 39. The upper part of the proboscis, magnified. *o* soft papillæ round the oral aperture; *p* papillæ on the upper part of the proboscis.
Fig. 40. Onchnesoma Sarsii opened, magnified. *r, r* retractor; *re, re* rectum; *s* segmental organ; *sp, sp* oesophagus; *t* intestine; *ts* circumvolution of intestine; *n* nervous cord.

TYLOSOMA, Nobis.*)

SLÆGTSCHARACTEREN.

Legemet cylindrisk, tæt besat med Papiller. Dets forreste Del afstumpet, bred, skjolddannet, paa hvis Midte en liden fremstaaende, rund Mundaabning. Strax under denne Analaabningen. Dets bagerste Ende conisk tilspidset. Ingen Snabel, ingen Tentakler, intet Karsystem.

TYLOSOMA LÜTKENII, Nobis.

(Tab. 13, Fig. 12, 13 A, B, C. Tab. 14, Fig. 16.)

Legemet cylindrisk, 15 Mm. langt, 4 Mm. bredt, tæt besat med Papiller, der paa den midterste Del af Kroppen ere noget fladtrykte og faa under Loupen et skaalformigt Udseende (Fig. 13 A), medens de saavel mod den forreste bredere, tvers afskaarne Ende, som mod den bagerste mere conisk tilspidsede Del, staa tættere, ere mere fremragende og conisk tilspidsede. Paa Kroppens bagerste Ende en tydelig Grube. Den forreste, bredere Del danner et næsten rundt Skjold, paa hvis Midtparti den lille, runde, fremstaaende Mundaabning sees. Huden er gjennemsigtig, saaledes at den mørke Tarm bliver dunkelt synbar. Under Mikroskopet vise Papillerne sig at være for en stor Del optagne af de kjertelformige Hudlegemer, der have en yderst kort Udførselskanal. Indenfor Huden findes Ring- og Længdemuskellaget ordnet paa samme Maade som hos Slægten Phascolosoma i Almindelighed, uden at særskilte Bundter fremstaa. En Retractor, der tager sit Udspring fra den bagerste Ende med to stærke Rødder (Tab. 14, Fig. 16 r, r), der udgjøre næsten Retractorens halve Længde, og hvoraf den ene er dobbelt saa bred som den anden. Retractoren gaar omtrent i Midten af Kropshulheden til den forreste Del af Spiserøret. Dette er smalt, langt, følger Retractoren og strækker sig ned til det Sted, hvor dennes tvende Rødder forene sig. Her gaar det over i Tarmen, der löber nu forover og gjør en Bøining, hvorefter den gaar under Retractor (Fig. 16 t) for at komme hen til venstre Side, hvor den danner en Slynge, og gaar saa næsten lodret bag mod det Sted, hvor Spiserøret ender. Her gjør den en Bøining, der ved musculøse Fibre er fæstet til Kropsvæggen, og gaar igjen forover hvor den paany bøier sig for atter horisontalt at strække sig meget langt bagtil (Fig. 16 t). Her gjør den nu en Bøining, hvilken ligeledes ved musculære Fibre er befæstet, idet den slynger sig over begge Retractorens Rødder, og kommer saa over til høire Side, hvor den, følgende Retractoren, gaar et Stykke fortil langs denne, og danner nu 3—4 spiralformige Slyngninger (Fig. 16 ts), — gaar atter over Retractorens Rødder til venstre Side, hvor den med flere stærke Fibre er fæstet til Kropsvæggen (Fig. 16 m); herfra gaar den i en meget krum Linie langs Rygfladen som Rectum (Fig. 16 re, re)

*) *Τύλος* Vorte, *σῶμα* Legeme.

TYLOSOMA, Nobis.*)

GENERIC CHARACTERISTICS.

The body cylindrical, densely covered with papillæ. Its anterior part, truncated, broad, scutiform, having in the centre a small prominent, round oral aperture. Immediately under this is the anal aperture. Its posterior extremity conically tapered. No proboscis, no tentacles, no vascular system.

TYLOSOMA LÜTKENII, Nobis.

(Tab. 13, fig. 12, 13 A, B, C. Tab. 14, fig. 16.)

The body is cylindrical, 15 Mm. long, 4 Mm. broad, densely covered with papillæ, which on the middle part of the body are somewhat flattened, and appear, under the magnifying glass, to be a saucer-shaped appearance (fig. 13 A), while, towards the anterior broader truncated extremity, as well as towards the posterior more conically tapered part, they stand more closely together, are more prominent, and conically pointed. On the posterior extremity of the body an evident hollow. The anterior broader part forms a nearly round shield, the middle part of which appears the small round prominent oral aperture. The skin is transparent, so that the dark intestine becomes dimly visible. Under the microscope, the papillæ shew themselves to be for a great part occupied by the glandular cuticular bodies, which have an extremely short excretion-canal. Inside of the skin, the annular and longitudinal muscles are found arranged in the same manner as in the genus Phascolosoma generally, without separate fascicles being produced. One retractor, which takes its issue from the posterior extremity, with two strong roots (Tab. 14, fig. 16 r, r), that form nearly half the length of the retractor, and of which one is twice as broad as the other. The retractor goes about in the middle of the perivisceral cavity to the anterior part of the oesophagus. The latter is narrow and long, accompanies the retractor and extends down to that place where the two roots of the retractor unite. Here it goes over into the intestine, which now runs forward and makes a bend, after which it goes under the retractor (fig. 16 t), coming to the left side, where it forms a circumvolution, and then goes nearly perpendicularly backward towards the place where the oesophagus terminates. Here it makes a bend, which is attached to the wall of the body by muscular fibres, and goes again forward, where it bends once more so as to extend itself again horisontally very far backward (fig 16 t). Here it makes another bend, which in like manner is attached by muscular fibres, twining itself over both the roots of the retractor, and so coming over to the right side, where, accompanying the retractor, it goes some distance forward along the latter, and forms

*) *Τύλος*, wort; *σῶμα*, body.

hen til Dyrets forreste Ende, hvor den udmunder paa Rygsiden omtr. 1 Mm. fra Mundaabningen.

Der er kun et Segmentalorgan, der paa Midten er udvidet og munder ud i Nærheden af Analaabningen (Fig. 16 s). Nervestrengen løber som sædvanligt langs Bugfladen, er temmelig tyk, afgiver en Mængde Sidegrene til Huden, Segmentalorganet, Spiserøret (Fig. 16 n, n). Paa dettes forreste Del danner Nerven en ganglionær Opsvulmen, hvorfra udsendes baade fortil og bagtil flere Grene, af hvilke en meget tyk følger Tarmrøret og afgiver Sidegrene til dette.

Kropshulheden er forsynet med et Peritoneum, ligt det hos Phascolosomaerne tidligere beskrevne, hvilket beklæder de i Hulheden indesluttede Organer.

Dyrets Farve er lysegul med mørkebrune Papiller paa dets forreste Ende. Kun to Exemplarer have vi fundet, det ene i Dalsfjorden (Søndfjord), det andet i Herløfjorden (Bergen) paa 50—80 Favnes Dyb, stenet Grund.

ARTSCHARACTEREN.

Legemet er omtrent 4 Gange saa langt som bredt. Papillerne paa begge Endepartier meget tætstaaende, fremragende og conisk tilspidsede; paa den øvrige Del af Kroppen runde, fladtrykte. Den bagerste Ende forsynet med en Grube. Farven lysegul med mørkebrune Papiller paa den forreste Ende. En Retractor. Et Segmentalorgan.

FORKLARING OVER FIGURERNE.

Tab. 13, Fig. 12. Tylosoma Lütkenii i naturlig Størrelse.
Fig. 13. Forstørret.
A. Kropspapiller under Loupeforstørrelse.
B. Papiller paa den bagerste Ende af Kroppen; samme Forstørrelse.
C. Papiller paa forreste Ende; forstørret.

Tab. 14, Fig. 16. Tylosoma Lütkenii, aabnet fra Bugen og forstørret. *m* Muskelfibre; *n, n* Nerve; *ngr* Nervegrene; *r, r, r* Retractor; *re, re* Rectum; *s* Segmentalorgan; *t, t* løse Tarmslynger; *ts* spiralformig Tarmslynge; *sp, sp* Spiserør.

PRIAPULIDÆ.

PRIAPULOIDES, Nobis.

SLÆGTSCHARACTEREN.

Legemets forreste Del danner Snabelen. Munden forsynet med Tænder. Analaabningen i den bagerste Ende og paa hver Side af den et langt cylindrisk Tilhæng (Gjælle?), besat med Blærer. Genitalporerne nedenfor og til Siden af Anus.

now 3—4 spiral circumvolutions (fig. 16 ts) — goes again over the retractor's roots to the left side, where it is attached by several strong fibres to the wall of the body (fig. 16 m); hence it goes in a very crooked line along the dorsal surface, as rectum (fig. 16 re, re), to the anterior end of the animal, where it has its orifice on the dorsal side about 1 Mm. from the oral aperture.

There is only one segmental organ, which in the middle is strongly enlarged, and has its orifice in the vicinity of the anal aperture (fig. 16 s). The nervous cord runs as usual along the ventral surface; it is rather thick, and furnishes a number of lateral branches to the skin, to the segmental organ and to the oesophagus (fig. 16 n, n). On the anterior part of the latter, the nerve forms a ganglionous swelling, from which there issue both forward and backward several branches. One of these is very thick; it accompanies the intestinal canal and furnishes lateral branches to it.

The periviceral cavity is provided with a peritoneum, like that previously described in the Phascolosomas, which covers the organs inclosed in the cavity.

The color of the animal is light yellow, with dark brown papillæ on its anterior extremity. We have only found two specimens, one in Dalsfjord (Søndfjord), the other in Herlöfjord (Bergen) in 50—80 fathoms depth, stony bottom.

SPECIFIC CHARACTERISTICS.

The body about 4 times as long as wide. The papillæ on both extreme parts standing very closely together, prominent and conically tapered; on the other part of the body, round and flattened. The posterior end having a hollow. The color light yellow with dark brown papillæ in the anterior extremity. One retractor. One segmental organ.

EXPLANATION OF THE FIGURES.

Tab. 13, fig. 12. Tylosoma Lütkenii, natural size.
Fig. 13. Magnified.
A. Papillæ of body under magnifying glass.
B. Papillæ on the posterior extremity of body, same magnifying power.
C. Papillæ on the anterior extremity, magnified.

Tab. 14, fig. 16. Tylosoma Lütkenii opened from the ventral side, magnified. *m* muscle fibres; *n, n* nerve; *ngr* nerve-branches; *r, r, r* retractor; *re, re* rectum; *s* segmental organ; *t, t* loose circumvolution of intestine; *ts* spiral circumvolution of intestine; *sp, sp* oesophagus.

PRIAPULIDÆ.

PRIAPULOIDES, Nobis.

GENERIC CHARACTERISTICS.

The anterior part of the body forms the proboscis. The mouth furnished with teeth. The anal aperture in the posterior extremity, and on each side of it a long cylindrical appendage (gill?) covered with vesicles. The genital pores below, and on the side of the anus.

PRIAPULOIDES TYPICUS, Nobis.

(Tab. 16, Fig. 10–14.)

Priapulus bicaudatus, Danielssen.

Forhandlinger ved de skandinaviske Naturforskeres tiende Møde, Christiania, 1868, Pag. 542.

Legemet cylindrisk, forsynet i dets bagerste Ende med to cylindriske Tilhæng, besatte med Blærer.

Dyrets hele Længde omtr. 60 Mm. Snabelen (Glans) er 16 Mm. lang, omtr. 18 Mm. i Omfang, har 25 efter Længden løbende Ribber, der ere besatte med hornagtige Spidser, som sidde i en Række paa Høiden af hver Ribbe, saaledes at en stor Spids afvexler med mindre Spidser. I Almindelighed svare 2, en stor og en liden Spids, til den indenfor Huden liggende Ringmuskel, ligesom hver Ribbe svarer til den indenfor værende Længdemuskel. Ribbene staa lige langt fra hinanden, naar undtages de to midterste paa Bugfladen, hvilke slutte sig næsten ganske sammen; Mellemrummene ere lidt fordybede. Paa den ligesom tvers afskaarne forreste Ende af Dyret (Snabelen) findes den runde Mundaabning omgivet af en temmelig bred, fast Vold, der ved en Fure skiller Mundpartiet fra Snabelen. Denne, der bagtil bliver noget smalere, gaar med en liden Fordybning over i Kroppen, som er 24 Mm. lang, og omtrent 14 Mm. i Omfang, og dannes af indtil 40 temmelig tydelig udprægede Ringe, hvoraf hver Ring, indtil de 6 bagerste, er besat med afstumpede Spidser, som staa meget vidt fra hinanden (omtrent 12 paa hver Ring). De 6 bagerste Ringe, der ere ligesaa fremspringende som de øvrige, ere paa deres nederste (bagerste) Rand forsynede med tætstaaende, store, hornagtige Spidser, hvorved disse Ringe adskille sig fra alle de andre.

I Furen foran disse 6 sidste Ringe sees enkelte Papiller af et lidet Knappenaalshoveds Størrelse. Kroppens bagerste Ende er noget afstumpet, og paa Midten findes en cirkelrund Aabning, Anus, forsynet med en Slutmuskel, som, idet Excrementerne gik igjennem den, indtog omtrent 3 Mm. i Diameter. Fra denne Aabning sees paa Huden en fin Søm, der gaar langs Bugfladen op igjennem Legemet og Snabelen ligetil Mundvolden, og som fremkommer ved den indenfor liggende hvide Nervestreng. Paa hver Side af Anus udspringer et cylindrisk Rør (Dyrets Haledel, Appendix), som er 20 Mm. langt, omtrent 5 Mm. i Omfang, og paa hvis bagerste, afrundede, butte Ende er en rund Aabning, der udvider og sammentrækker sig, og som omgives af en tynd Vold. I udvidet Tilstand er Aabningen omtrent 1 Mm. i Diameter. Dette Rør er indtil omtrent 3 Mm. fra den bagerste Ende tæt besat med store ægformige Blærer, der staa temmelig regelmæssig omkring Stammen saaledes, at 5 store afvexle med 5 smaa; de forreste Blærer ere dog de mindste. Disse Blærer, der ere paa deres ydre Flade besatte med smaa Papiller, kunne udvide og sammentrække sig, og ere i udvidet Tilstand temmelig gjennemsigtige.

PRIAPULOIDES TYPICUS, Nobis.

(Tab. 16, fig. 10—14.)

Priapulus bicaudatus, Danielssen.

Forhandlinger ved de skandinaviske Naturforskeres tiende Møde, Christiania, 1868, p. 542.

The body cylindrical, having at its posterior extremity two cylindrical appendages, covered with vesicles.

The whole length of the animal is about 60 Mm. The proboscis (glans) is 16 Mm. long, and about 18 Mm. in circumference; it has 25 ribs running longitudinally, and covered with horn-like points, which stand in a row on the height of each rib; so that a large point alternates with smaller points. Usually 2, a large and a small point, correspond with the annular muscle situated inside the skin; as also each rib answers to the corresponding longitudinal muscle inside. The ribs are equidistant from each other, excepting the two middle ones on the ventral surface, which are nearly close together. The intervals are a little excavated. On the anterior extremity of the animal, which is, as it were, truncated (the proboscis) there is the circular oral aperture surrounded by a rather broad, firm ridge, which by a furrow divides the oral part from the proboscis. The latter, which becomes somewhat narrower behind, goes, with a little furrow, over into the body, which is 24 Mm. long and about 14 Mm. in circumference, and is formed of a number of up to 40 rather distinctly marked rings, of which each ring, until the 6 posterior ones is covered with truncated points standing very far from each other (about 12 on each ring). The 6 posterior rings, which are as prominent as the others, are on their lower (posterior) margin fournished with large horny points, whereby these rings are distinguished from all the others.

In the furrow before these 6 last rings, there appear a few papillæ of the size of a small pin's head. The posterior end of the body is somewhat truncated, and in the middle there is a circular aperture (anus), which is provided with a closing muscle, and which, when the excrements went through it, occupied about 3 Mm. in diameter. From this aperture there is on the skin a fine suture, going along the ventral surface, through the body and the proboscis right up to the oral ridge, and produced by the white nervous cord lying inside. On each side of the anus there issues a cylindrical tube (the caudal part of the animal, appendix), which is 20 Mm. long and about 5 in circumference, having on its posterior rounded obtuse extremity a round aperture, which extends and contracts itself, and which is surrounded by a thin ridge. When extended, the aperture is about 1 Mm. in diameter. This tube is, up to about 3 Mm. from its posterior extremity, thickly covered with large oval vesicles situated rather regularly round the stem; so that 5 large ones alternate with 5 small ones; the anterior vesicles are however the smallest. These vesicles, which are on their outer surface covered with small papillæ, can extend and contract themselves; and they are when inflated rather transparent.

Nedenfor Anus paa hver Side af den omtalte Søm, altsaa paa Bugfladen, findes en hvid fremragende Vorte af et Knappenaalshoveds Størrelse, omgivet af en Krands yderst smaa runde Papiller, og paa hvis midterste Del er en yderst fin Aabning (Genitalporen). Tarmrøret, der, om man vil, bestaar af 3 Dele, Svælget, Mellemtarmen og Endetarmen, begynder ved Mundaabningen, og løber i ret Linie bag mod Legemets Ende, hvor det udmunder i den tidligere beskrevne Anus. Tarmrøret er kun ved Mund og Anus fæstet til Kropshulheden, og har baade paa Ryg- og Bugfladen en fin hvidagtig Streng (Kar), der er forbunden til Tarmen ved Bindevæv. Svælget er temmelig vidt, især fortil, og har en Længde af omtr. 10 Mm. Det er forsynet med 8 Rækker Tænder, hvoraf de 4 forreste Rækker ere de største, kunne sees med blotte Øine, og have en ensartet Bygning, der kun varierer med Hensyn til Størrelse, imedens de 4 bagerste Rækker, som kun vanskeligen kunne sees med ubevæbnet Øie, have en noget forskjellig Bygning fra de forreste. I den første Række staa 5 store, haarde, hornagtige, ravgule Tænder, hvis Basis sidder ligesom nedsænket i en liden rund, fast, ophøiet Knude, og hvis store Spids (Fig. 12 a, a) ligner et Papagøinæb og rager frit bagtil og indad i Svælget. I de øvrige 3 Rækker er der fra 8—12 mindre; aldeles lignende Tænder. Hver Tand dannes af en Basaldel (Rod) og af en Krone. Basaldelen, der er fæstet i den omtalte Knude, har en femkantet Form, saaledes at de to Hjørner staa inderst mod Svælgvæggen, og de tre, som indtage den bredere Del af Tandroden, staa yderst. Kronen rager op fra Rodens bredere, trekantede Del, bestaar af 14—15 Spidser, hvoraf den midterste er omtr. 3 Gange saa lang og tyk som de øvrige, er stærkt krumbøiet, glat, og springer med sin spidse Ende frit ud i Svælget. Paa hver Side af denne Spids staar en Række 6—7 meget mindre Spidser, der ligeledes ere krumbøiede, have omtrent samme Form som den store og vende mod denne. Alle disse Spidser ere i Forhold til Svælgvæggen rettede bagtil og indad. I de 4 bagerste Tandrækker findes et langt større Antal meget smaa Tænder. Disse have en næsten firkantet Basaldel, hvorfra udspringer en noget krumbøiet Midtspids (Fig. 13 a), paa hvis Sider sidde 6—8 mindre Spidser, der aftage i Størrelse, alt eftersom de nærme sig Midtspidsens yderste, spidse Ende. Den hele Tand har nogen Lighed med en Pyramide, hvis øverste Sidekanter ere stærkt saugtakkede. Hvor Svælget gaar over i den egentlige Tarm, er en Indsnøring. Fra denne udvider Tarmen sig stærkt, gaar bagover, idet den bliver alt smalere og smalere, indtil den gaar over i Rectum. Den egentlige Tarm er omtr. 22 Mm. lang; Rectum er omtr. 8 Mm. lang, temmelig smal, meget musculøs og udmunder i Midten af Legemet, noget nærmere Rygsiden. Paa hver Side af Rectum findes et aflangt, bladformigt, lappet Organ (Kjønsorganet), omtr. 20 Mm. langt og paa det Bredeste omtr. 4 Mm. Dets forreste, frie Ende er conisk tilspidset; dets bagerste, bredere Del gaar successivt over i en temmelig tynd, rund Udførselskanal, som udmunder i den

Below the anus, on each side of the suture mentioned, that is on the ventral surface, there is a white prominent wart of the size of a pin's head, surrounded by a circlet of extremely small, round papillæ, and having in its central part an extremely fine aperture (the genital pore). The intestinal canal, which, so to say, consists of 3 parts, the gullet, the middle instetine and the rectum, begins at the oral aperture and runs in a straight line backward towards the end of the body, where it has its eduction through the anus previously described. The intestinal canal is only attached at the mouth and at the anus to the perivisceral cavity, and has, both on the dorsal and the ventral surface, a fine whitish cord (vessel), which is attached to the intestine by connecting tissue. The gullet is rather wide, especially in front, and has a length of about 10 Mm. It is furnished with 8 rows of teeth, of which the 4 anterior rows are the largest and may be seen with the naked eye. These have a uniform structure, and vary only in respect of size; while the 4 posterior rows, which can only with difficulty be perceived by the unassisted eye, have a very different structure from the others. In the first row there are 5 large, hard, horny, amber-yellow teeth, the basis of which is planted, as it were, in a little, round, firm, elevated tubercle, and the large point of which (fig. 12 a, a) resembles a parrot's beak and projects freely backward and inward in the gullet. In the other 3 rows, there are from 8—12 smaller, entirely similar teeth. Every tooth is formed of a basal part (root) and of a crown. The basal part, which is fixed in the tubercle mentioned, has a pentagonal form; so that the 2 angles are inside towards the wall of the gullet, and the 3, which are in the broader part of the root of the tooth, lie outwards. The crown projects up from the broader three-cornered part of the root, and consists of 14—15 points, of which the middle one is about 3 times as long and thick as the others. It is strongly crooked, smooth, projecting freely with its pointed end in the gullet. On each side of this point there stand in one row 6—7 much smaller points, which are likewise crooked, having the same form as the larger one and turning towards it. All these points are, in relation to the wall of the gullet, directed backward and inward. In the 4 posterior rows of teeth, there are a much greater number of very small teeth. These have a nearly quadrangular base, whence there issues a somewhat crooked middle point (fig. 13 a), on the side of which there are 6—8 smaller points diminishing in size as they approach the extremely fine apex of the middle point. The whole tooth has some resemblance to a pyramid, the upper side edges of which are strongly serrated. Where the gullet goes over into the proper intestine, there is an instriction. From this the intestine becomes strongly enlarged, and then goes backward, becoming narrower and narrower, until it goes over into the rectum. The proper intestine is about 22 Mm. long, the rectum is about 8 Mm. long, rather narrow, very muscular and has its aperture in the middle of the body a little nearer to the dorsal side.

tidligere beskrevne fine Aabning nedenfor Anus. Lige i Bunden af Kropshulheden findes paa hver Side af Rectum en rund Aabning, der er omgiven af en liden Vold, og som fører ind til den saakaldte Hale (Appendix), det tidligere cylindriske Rør. Paa dettes indre Flade, der er stærkt musculøs, iagttages en Mængde fine Aabninger, som føre ind til de ægformige Blærer. Disse ere ligeledes paa deres indre Flade forsynede med en Mængde Muskelfibre.

Foruden Ring- og Længdemusklerne, der ligge paa Dyrets indvendige Flade, er Snabelen forsynet med lange og korte Retractorer. Af de lange, som ere 8 i Tallet, temmelig brede, tage 4 deres Udspring rundt om Rectum lige i Bunden af Kropshulheden, medens 4 udspringe omtr. 4—5 Mm. foran; alle løbe de forover og fæste sig omkring den forreste Ende af Svælget. De korte Retractorer ere 10—12, udspringe paa Grændsen mellem Snabelen og Kroppen, og fæste sig lige ved Siden af de lange. Paa Bugfladen, just der hvor den tidligere beskrevne Søm findes paa Huden, løber Nervestrengen fra Anus langs den indvendige Flade af Legemet til den forreste Ende af Snabelen, hvor den deler sig i to Grene, der omfatte Svælget. Hele Kropshulheden og Snabelen er beklædt af et Peritoneum.

Af Priapuloides typicus er fundet kun 2 Exemplarer i Varangerfjorden (Østfinmarken) paa 120 Favnes Dyb. Dyret lever paa Lerbund. Leret, hvori det er nedgravet, har en svag rosenrød Farve. I levende Live er Dyrets Farve hvidgul. De tvende Tilhæng (Haler) udvide og sammentrække sig samtidigt og regelmæssigt, og naar Aabningen paa Cylinderens bagerste Ende udvider sig, udspændes Blærerne og blive gjennemsigtige. Udvidningen og Sammentrækningen af den yderste Aabning og Blærerne vare fuldkommen rhythmiske, mellem 40 og 50 i Minuttet, og lignede Aandedrættet hos Holothurierne.

ARTSCHARACTEREN.

Legemets Længde 60 Mm. Snabelen 25 Længderibber, besatte med afvexlende større og mindre Pigge. Kroppen indtil 40 Ringe, hvoraf de 6 bagerste ere paa deres nederste Rand besatte med Pigge. Mundaabningen rund. I Svælget 8 Rækker Tænder; i de 4 første har hver Tand en stor Midtspids med 12—14 Sidespidser; i de 4 bagerste er der ligeledes en Midtspids med 12—16 Sidespidser. 8 lange, 10—12 korte Retractorer. Af de 8 lange tage 4 deres Udspring i Bunden af Kropshulheden rundtom Rectum; de andre 4 udspringe omtrent 4 Mm. foran.

On each side of the rectum there is an oblong, leaf-shaped, lobed organ (the sexual organ) about 20 Mm. long, and in its greatest breadth about 4 Mm. Its anterior free end is conically tapered. Its posterior broader part goes successively over into a rather thin, round excretions-canal issuing in the previously described fine aperture below the anus. Innermost at the bottom of the perivisceral cavity, there is on each side of the rectum a circular aperture, surrounded by a little ridge and leading into the so-called tail (appendix), the cylindrical tube previously described. On the inner surface of this, which is strongly muscular, there were observed a number of fine openings leading into the oval vesicles. The latter are likewise, on their interior surface, provided with a number of muscular fibres.

Besides the annular and longitudinal muscles situated on the interior surface of the animal, the proboscis is also furnished with long and short retractors. Of the long ones, which are 8 in number and rather broad, 4 take their origin round about the rectum, just at the bottom of the perivisceral cavity; while 4 issue about 4—5 Mm. in front; all run forward and insert themselves around the anterior extremity of the gullet. The short retractors are 10—12, and issue on the border between the proboscis and the body, inserting themselves just at the side of the long ones. On the ventral surface, exactly where the suture previously described appears on the skin, the nervous cord runs from the anus along the interior surface of the body to the anterior end of the proboscis, where it divides itself into two branches encircling the gullet. The whole perivisceral cavity and the proboscis are covered with the peritoneum.

Of the Priapuloides typicus, only 2 specimens have been found in the Varangerfjord (East Finmark) at the depth of 120 fathoms. The animal lives on clayey bottom. The clay wherein it is buried has a pale rosy color. The color of the living animal is whitish yellow. The two appendices (tails) extend and contract themselves simultaneously and regularly; and when the aperture on the posterior end of the cylinder expands, the vesicles are inflated and become transparent. The expansions and contractions of the exterior opening and of the vesicles were quite rhythmical and about 40—50 in the minute, resembling the breathing in the Holothuriæ.

SPECIFIC CHARACTERISTICS.

The length of the animal 60 Mm. The proboscis has 25 longitudinal ribs covered with alternating larger and smaller spines. The body has up to 40 rings, of which the 6 posterior are on their lower margin covered with spines. The oral aperture, round. In the gullet 8 rows of teeth; in the 4 first, each tooth has a large middle point with 12—14 lateral points; in the 4 posterior it is likewise a middle point with 12—16 lateral points; 8 long, 10—12 short retractors. Of the 8 long, 4 take their issue at the bottom of the perivisceral cavity round the rectum, the other 4 issue about 4 Mm. in front.

FORKLARING OVER FIGURERNE.

Tab. 16, Fig. 10. Priapuloides typicus i naturlig Størrelse. *p, p* Aabningen paa Haletilhænget (Appendix).

Fig. 11. Svælgets indre Væg, lidt forstørret. *d, d* Tænderne.

Fig. 12^1. Tænderne i de 4 første Rækker, forstørret. *a* den midterste Spids; *b* Basaldel.

Fig. 12^2. Tænderne, stærkt forstørret. *a* og *b* som den foregaaende; *c* Sidespidser.

Fig. 13^{1-2}. Tænder af de bagerste Rækker, forstørret. Bogstaverne som de foregaaende.

Fig. 14. Analdelen med de tvende Appendices. *a* Anus; *g, g* Genitalporer; *ap, ap* Tilhænget (Appendix); *p, p* Aabningen paa Haletilhænget; *v, v* Blærer.

PRIAPULUS CAUDATUS, Lam.

Priapulus glandifer, Ehlers.

Priapulus brevicaudatus, Ehlers.

Zeitschr. f. wiss. Zoologie, 11 B., Pag. 209, Taf. XXI, Fig. 23, 24.

Ehlers har opstillet 2 fra Priapulus caudatus forskjellige Arter, nemlig Pr. glandifer og Pr. brevicaudatus; men han gjør dog opmærksom paa, at der tiltrænges en nøiagtigere Undersøgelse for at kunne faa disse Arter constaterede; thi han har kun havt Spiritusexemplarer at raade over, og dertil meget faa, nemlig 1 af hver Art. Frey og Leuckart have undersøgt det ene Exemplar af brevicaudatus og antaget det for at være den almindelige Pr. caudatus. Vi have nu gjennemgaaet en hel Del Exemplarer af Priapulus caudatus, undersøgt dem grundigen i forskjellige Aldersstadier baade i deres Ydre og i deres Anatomi, og vi ere komne til det Resultat, at begge Ehlers's Arter ikke ere andet end Priapulus caudatus lidt varieret. Vi have nemlig fundet Exemplarer med korte Tilhæng, meget lange Generationsorganer, en lige Tarm og 8 lange Retractorer udspringende i omtrent lige Linie paa den bagerste Del af Kroppen; vi have fundet andre, hvor Tilhænget har været meget langt, Generationsorganerne korte, Tarmen lang og bøielig, hvor to af de 8 lange Retractorer have taget Udspring lidt foran de 6 andre. Endelig have vi truffet paa Exemplarer, hvor Tilhænget har havt almindelig Længde, hvor Tarmen har været lige, hvor Generationsorganerne have været lange, og Retractorerne lige lange. Hvad nu Tænderne angaar, saa variere de noget i Form, ligesom den midterste Spids kan være mere og mindre krumbøiet.

Se vi nu hen til de Characterer, der have begrundet Ehlers's to Arter, saa finde vi disse saa svage og saa lidet udprægede, at vi gjenfinde dem alle hos den typiske Priapulus caudatus. Saaledes opstiller Ehlers for Pr. glandifer en Tarm med en stor Slynge og meget lange Generationsorganer, — og for Pr. brevicaudatus en Tarmkanal, der ikke er ganske udstrakt, de forreste Tænder i Svælget svage (mindre) og 4 Spidser paa hver Side af Tandens Midtspidse; 8 lange Retractorer, hvoraf de 2 ere kortere; Tilhænget meget kort. Men som vi ovenfor have paavist hos Pr. caudatus, kan Tarmen dels være mere eller mindre bugtet, dels lige; ligesom Generationsorganerne kunne være mere eller mindre lange; dels kan der

EXPLANATION OF THE FIGURES.

Tab. 16, fig. 10. Priapuloides typicus, natural size. *p, p* aperture in the caudal appendix.

Fig. 11. Inner wall of the gullet, slightly magnified. *d, d* teeth.

Fig. 12^1. Teeth in the 4 first rows, magnified. *a* the central point; *b* the basal part.

Fig. 12^2. The teeth, strongly magnified. *a* and *b* as in the preceding; *c* lateral points.

Fig. 13^{1-2}. Teeth of the back rows, magnified. Letters as in the preceding.

Fig. 14. Anal part with the two appendices. *a* anus; *g, g* genital pores; *ap, ap* appendix; *p, p* aperture for the caudal appendix; *v, v* vesicles.

PRIAPULUS CAUDATUS, Lam.

Priapulus glandifer, Ehlers.

Priapulus brevicaudatus, Ehlers.

Zeitschr. f. wiss. Zoologie, 11 B., p. 209, Taf. XXI, fig. 23, 24.

Ehlers has established 2 species differing from the Priapulus caudatus, namely Pr. glandifer and Pr. brevicaudatus; but he remarks however, that a more accurate investigation is required to get these species confirmed; for he has only had spirit specimens at his disposal, and very few of them, namely one of each. Frey and Leuckart have examined the one specimen of brevicaudatus, and considered it to be the ordinary Pr. caudatus. We have now gone through a great number of specimens of Priapulus caudatus, examined them thoroughly in various ages both in their exterior and in their anatomy; and we have come to the conclusion that both Ehlers' species are no other than Priapulus caudatus a little varied. We have found specimens with short appendices, very long organs of generation, a straight intestine and 8 long retractors issuing in about a straight line on the posterior part of the body; we have found others where the appendix has been very long, the organs of generation short, the intestine long and curved, and where two of the 8 long retractors have taken their issue a little in front of the 6 others. Finally we have met with specimens, where the appendix has been of the usual length, the intestine straight, the organs of generation long and the retractors equally long. As to the teeth, they vary somewhat in form, as also the middle point may be more or less crooked.

If we now consider the characteristics on which Ehlers' two species have been founded, they appear to us so feeble and so indefinite, that we may find them all again in the typical Priapulus caudatus. Thus Ehlers indicates for the Pr. glandifer, an intestine with a large circumvolution and very long organs of generation, — and for Pr. brevicaudatus an intestinal canal which is not entirely extended; the anterior teeth in the gullet feeble (smaller) and 4 points on each side of the middle point of the tooth; 8 long retractors, of which 2 are shorter; the appendix very short. But as we have previously shewn in Pr. caudatus, the intestine may be sometimes more or less bent and sometimes straight; as also the organs

ogsaa være smaa Variationer med Hensyn til Tænderne, Retractorernes Udspring og Tilhængets Længde, — saa at vi ere komne til den fulde Overbevisning, at de Characterer, Ehlers har angivet for sine to Arter, ikke ere constante.

ECHIURIDÆ.

ECHIURUS (THALASSEMA) VULGARIS, Savigny.

Forekommer i Christianiafjorden paa 5—10 Favnes Dyb, Lerbund; og i Øxfjord (Finmarken) er der fundet 1 Exemplar.

ECHIURUS LÜTKENII?, Dies.

Dr. G. A. Hansen har fundet i Søndfjord paa 200 Favnes Dyb, seig Lerbund, to Exemplarer af en Echiurus, som meget ligner den af Diesing beskrevne Echiurus Lütkenii. Den afviger dog fra denne derved, at den er meget større; — Kroppen er nemlig 46 Mm. lang, 20 Mm. tyk, Snabelen 14 Mm. lang, 6 Mm. bred — at den i den bagerste Ende af Kroppen har flere Pigge — 7 i det forreste, 6 i det bagerste Belte, og endelig at den har en skidden hvid Farve baade paa Krop og Snabel.

BONELLIDÆ.

BONELLIA VIRIDIS, Rolando.

Forekommer temmelig sjelden i Bergensfjorden og Korsfjorden paa en Dybde af 50—100 Favne, sandig Bund.

of generation may be longer or shorter; sometimes there may also be small variations with respect to the teeth, the issue of the retractors and the length of the appendix, — so that we have come to the full conviction that the characteristics which Ehlers has given for his two species are not constant.

ECHIURIDÆ.

ECHIURUS (THALASSEMA) VULGARIS, Savigny.

Occurs in the Christianiafjord at the depth of 5—10 fathoms, clay bottom; and in Øxfjord (Finmark) one specimen has been found.

ECHIURUS LÜTKENII?, Dies.

Dr. G. A. Hansen has found in Søndfjord, at the depth of 200 fathoms, on tough clayey bottom, two specimens of an Echiurus, which is very much like that described by Diesing, Echiurus Lütkenii. It differs however from this species by being much larger; — the body being 46 Mm. long, 20 Mm. thick, the proboscis 14 Mm. long, 6 Mm. broad — by having more spines in the posterior extremity of the body — 7 in the anterior, 6 in the hindermost belt — and finally by having a dirty white color both on the body and on the proboscis.

BONELLIDÆ.

BONELLIA VIRIDIS, Rolando.

Rather scarce in the Bergensfjord and Korsfjord at the depth of 50—100 fathoms, sandy bottom.

TILLÆG
TIL
GEPHYREERNE.

Omtrent et halvt Aar efterat vor Afhandling over Gephyreerne var afsluttet og overgivet til Trykken,[1]) have vi modtaget 3 Arbeider over samme Dyrklasse, to af Hjalmar Théel[2]) og et af Dr. Teuscher[3]).

Da der i disse Afhandlinger findes enkelte Afvigelser fra vore Observationer, have vi troet at burde gjøre nogle Bemærkninger i den Anledning.

Dr. Théel har dannet en ny Slægt af Phascolosoma Strombi, hvilken han kalder Phascolion, og angiver som Grund derfor, at den „i flere vigtige Punkter adskiller sig fra Slægterne Sipunculus og Phascolosoma."

Allerede Keferstein har fremhævet disse Punkter, men dog ikke trøstet sig til derpaa at grunde en ny Slægt, idet han formener, at først naar andre nærstaaende Arter ere nøiagtig kjendte, naar Exemplarer fra mange forskjellige Localiteter ere undersøgte, først da er Tiden kommen til at afgjøre, hvorvidt Ph. Strombi bør danne en ny Slægt eller ikke. Under vore Undersøgelser over Gephyreerne have vi havt til Raadighed en stor Mangfoldighed af Exemplarer af Ph. Strombi fra de forskjelligste Localiteter, lige fra Vadsø (Finmarken) til Christiania. Vi vare ingenlunde fremmede for de Forskjelligheder, Ph. Strombi frembød ved at sammenligne den med andre Phascolosoma-Arter, hvilket forresten klart nok var fremhævet af Keferstein; men jo flere Exemplarer vi undersøgte, jo tydeligere viste det sig, at den var underkastet mange Variationer baade i det Ydre og Indre, — saa vi enten af disse Varieteter maatte danne mange Arter — ja endog enkelte Slægter, dersom vi betragtede hver Afændring for sig uden at sammenholde den med andre, eller da maatte vi, som flere andre Forfattere have gjort, blive staaende ved den gamle, gode Art, — og forsaavidt Afvigelserne bleve altfor store, da danne særskilte Afarter. I denne vor Opfatning bleve vi end

[1]) Indsendt til Magazin for Naturvidenskaberne i Midten af Januar, 1875.

[2]) Recherches sur le Phascolion (Phascolosoma) Strombi, Mont. par Hjalmar Théel. Communiqué à l'académie des sciences de Suède le 10 Février 1875. — Etudes sur les Géphyriens inermes des mers de la Scandinavie, du Spitsberg et du Groenland par Hjalmar Théel. Communiqué à l'académie des sciences de Suède le 10 Mars 1875.

[3]) Notiz über Sipunculus und Phascolosoma von Dr. R. Teuscher. Jenaische Zeitschrift für Naturwissenschaft, 8 Bd., 4 Heft, Pag. 488.

APPENDIX
TO
THE GEPHYREÆ.

About half a year after our treatise on the Gephyreæ was terminated and delivered to the printer[1]) we received 3 works on the same class of animals: 2 by Hjalmar Théel[2]), and 1 by Dr. Teuscher[3]).

As in these treatises there are found a few differences from our observations, we have thought it right to make some remarks on the occasion.

Dr. Théel has formed a new genus of Phascolosoma Strombi, which he calls Phascolion, and gives as his reason that „it differs in many important points from the genera Sipunculus and Phascolosoma."

Keferstein had already noticed these points, but had not ventured on the strength of them to establish a new genus; being of opinion that only when other nearly related species are more accurately known; when specimens from many different localities shall have been examined, only then will the time be come to decide how far Ph. Strombi should form a new genus or not. In the course of our examinations of the Gephyreæ, we have had at our disposal a great variety of specimens of Ph. Strombi from the most various localities, even from Vadsö (Finmark) to Christiania; we were by no means unaware of the differences which Ph. Strombi exhibited, when compared with other species of Phascolosoma, which moreover had been very distinctly noticed by Keferstein; but the more specimens we examined, the more evident it became that is was subject to many variations both external and internal; so that from these varieties we must either have formed many species, nay even a few genera, if we had considered each variation for itself without comparing it with others, or else we must have kept to the good old species, as many other authors have done, and, for as much as the differences became too great, formed separate variations. In this our conception, we were

[1]) Sent to the Magazin for Naturvidenskaberne in the middle of January, 1875.

[2]) Recherches sur le Phascolion (Phascolosoma) Strombi, Mont. par Hjalmar Théel. Communiqué à l'académie des sciences de Suède le 10 Février 1875. — Etudes sur les Géphyriens inermes des mers de la Scandinavie, du Spitsberg et du Groenland par Hjalmar Théel. Communiqué à l'académie des sciences de Suède le 10 Mars 1875.

[3]) Notiz über Sipunculus und Phascolosoma von Dr. R. Teuscher. Jenaische Zeitschrift für Naturwissenschaft, 8 Bd., 4 Heft, Pag. 488.

yderligere bestyrkede ved at undersøge andre Arter, der frembøde ligesaa store Afvigelser fra Slægten Phascolosoma som Ph. Strombi, uden at vi derfor saa nogen Grund til at danne nye Slægter, da Forskjellighederne ligesaalidt hos denne som hos hine vare saa væsentlige, at de kunde begrunde Dannelsen af nye Slægter.

De før nævnte vigtige Punkter, der efter Hr. Théel udgjøre det Eiendommelige for Slægten Phascolion, og hvorved den adskiller sig fra Slægterne Sipunculus og Phascolosoma ere Følgende:

Tentaklerne ere trekantede; Snabelen kan indtrækkes lige til Analaabningen, og i den bagerste Kropsende findes ingen Aabning i Form af en stor Pore. Kun to Retractorer, hvoraf den ventrale, der er den mindste, deler sig ved Basis i to Rødder. Digestionsapparatet danner to Circumvolutioner, der ere mere eller mindre spiralformige, og som ere fæstede til Kropshulheden ved mange radiære Muskler.

Hertil skulle vi bemærke, at Tentaklerne hos Phascolosoma-Arterne variere overmaade meget saavel i Antal som Form, og have hidtil ikke engang kunnet tjene til paalidelige Artsmærker. At Snabelen trækkes ind til Analaabningen, finder temmelig hyppig Sted hos flere Arter, og kan ligesaalidt som Tentaklernes Form være noget sikkert Bestemmende for Arten og endnu mindre for Slægten. At Phascolion mangler en Aabning i den bagerste Kropsende, kan dog vanskeligt være noget Eiendommeligt for den, da saavel de Arter af Slægten Phascolosoma og Sipunculus, vi have undersøgt, som af vore nye Slægter lider af den samme Mangel. Og saavidt os bekjendt har endnu ingen Forsker paavist med Sikkerhed den heromtalte Aabning, om hvis Tilværelse, som bekjendt, har været stridt adskilligt. — Retractorerne have vi fundet meget forskjellige med Hensyn til Udspring, Form og Antal ikke alene hos Slægten Phascolosoma, men ogsaa hos enkelte af vore nye Slægter; men Forskjelligheden hos den enkelte Art, hvor stor den end har været, har dog altid været af en saadan Natur, at vi have kunnet finde Overgange hos nærstaaende Arter, saa at vi vel i en saadan Varieren af Retractorerne have fundet et Hjælpemiddel til yderligere at characterisere Arten, men ingenlunde noget saa stærkt Eiendommeligt, at vi deraf vovede at grunde en ny Slægt. Og vi tro heller ikke, at Retractorernes Antal er noget saa væsentligt, at, naar ikke andre vigtigere Særegenheder optræde, man da ved Hjælp af dem skulde kunne udsondre af Arter nye Slægter. Vi have saaledes seet Phascolosoma-Arter med 4, 2 og 1 Retractor, ligesom vi hos vore nye Slægter have dels 1 Retractor uden Rødder (Onchnesoma Steenstrupii), dels 1 Retractor med lange Rødder (Tylosoma Lütkenii), der ere fæstede paa Dorsal- og Ventralfladen. Dersom vi skulde have ladet os nøie med Skjelnemærker som de af Dr. Thèel angivne til Dannelsen af nye Slægter, havde vi visseligen af Ph. squamatum grundet en ny Slægt; thi det staar ikke til at nægte, at denne Art frembyder større Afvigelser end Ph. Strombi; men for os stille Fordringerne til en Slægts Dannelse sig større, idet vi formene,

further confirmed by examining other species, which exhibited quite as great deviations from the genus Phascolosoma as Ph. Strombi, without finding any reason to form new genera; as the differences were, neither in one case nor in the other, so essential as to warrant the formation of new genera.

The before named important points, which, according to Mr. Théel, constitute the peculiarities of the genus Phascolion, and whereby it is distinguishable from the genera Sipunculus and Phascolosoma, are the following:

The tentacles are 3 sided; the proboscis can be retracted even to the anal aperture, and in the posterior extremity of the body there is no opening in the form of a large pore. Only two retractors, of which the ventral one, which is the smallest, is divided at the base into two roots. The apparatus of digestion forms two circumvolutions which are more or less spiral, and which are attached to the perivisceral cavity by many radiary muscles.

We must here remark that the tentacles in the species of Phascolosoma vary in an extraordinary degree, as well in number as in form, and have hitherto not even been able to serve as trustworthy specific marks. That the proboscis is drawn in to the anal aperture, is something which occurs rather frequently in several species, and can just as little as the form of the tentacles, be any certain criterion of the species, still less of the genus. That the Phascolion has no opening in the posterior end of the body, can scarcely be anything peculiar to it; because the species of the genera Phascolosoma and Sipunculus, which we have examined, as well as those of our new genera, have the same deficiency. And so far as we know, there has been yet no naturalist, who has demonstrated with certainty the existence of this opening, about which, as is well known, there has been a good deal of controversy. We have found the retractors differing with respect to their issue, form and number, not only in the genus Phascolosoma, but also in some of our new genera; but the differences in the single species, however great it may have been, has still always been of such a nature as to enable us to find transitions in species closely related; so that such a variation in the retractors has furnished us with auxiliary means of characterising the species more particularly; but we have been far from finding therein anything so strongly peculiar, as to warrant our venturing to base a new genus thereon. Neither do we think that the number of the retractors is anything so essential, that, when no other more important peculiarities appear, we should be able thereby to select new genera out of a number of species. We have thus seen species of Phascolosoma with 4, 2 and 1 retractor; just as we have, in our new genera, sometimes 1 retractor without roots (Onchnesoma Steenstrupii) sometimes 1 retractor with long roots (Tylosoma Lütkenii), attached to the dorsal and ventral surface. If we had been satisfied with the characteristics indicated by Dr. Théel for the establishing of new genera, we should certainly have made a new genus of Ph. squamatum; for it

at de Forskjelligheder, som skulle begrunde en ny Slægt, maa ikke være enkelte ydre eller indre Afvigelser fra Grundtypen; men maa være af en Organismen mere gjennemtrængende Natur.

Hvad nu de nye Arter under Slægten Phascolion betræffer, saa have vi Grund til at antage, at de kun ere Varieteter af Ph. Strombi. Vi have opstillet en Varietet under Navnet Ph. Strombi var. verrucosum, som upaatvivlelig falder sammen med Ph. tuberculosum, Théel, — og Grunden, hvorfor vi ikke af den dannede en ny Art, var simpelthen den, at vi traf flere Overgangsexemplarer, der mere og mere nærmede sig Hovedformen.

Phascolion spitsbergense, Th., har saameget tilfælles med Exemplarer, vi have fra Vadsø, og som aabenbart ikke ere nye Arter, men vel Varieteter af Strombi, at vi ogsaa med Hensyn til den nære Tvivl om dens Bestaaen som selvstændig Art. Vi kunne imidlertid ikke gaa videre end at fremsætte vore Tvivl og begrunde disse saa godt som muligt; thi vi have ikke været i Besiddelse af Hr. Théels Originalexemplarer.

Nu skulle vi omtale de nye Arter af Slægten Phascolosoma, som Hr. Théel har opstillet.

Phascolosoma luteum, Th., er sikkerlig, som Dr. Théel selv antager, Kefersteins margaritaceum, der jo er ganske forskjellig fra Sars's margaritaceum; forsaavidt er det i sin Orden, at Théel har givet Arten et nyt Navn. Men da Ph. luteum, Th., og margaritaceum, Keferst., falde sammen med Forbes's Ph. (Syrinx) Harveii, saa formene vi, at Ph. luteum maa ned i Synonymiens Rækker.

Phascolosoma dubium, Th., har Dr. Théel fundet at være usikker — hvilket ogsaa Navnet tyder hen paa — idet han siger, at den nærmer sig Kefersteins elongatum og Blainville's vulgare. Fra disse skal den dog adskille sig ved et lidet større Antal Tentakler, samt ved Mangelen af to Pigmentpunkter (Øienpunkter). Tentaklernes Antal varierer jo særdeles meget, og Pigmentet forsvinder i Regelen temmelig hurtigt ved Opbevaring i Spiritus; ligesom det er meget sandsynligt, at der hos denne Art forekommer Exemplarer, hvor disse Pigmentpunkter mangle, — saaledes er idetmindste Tilfældet med Ph. margaritaceum, Sars. Vi antage derfor, at Ph. dubium falder sammen med Ph. elongatum, Keferst. og Ph. vulgare, Blainv.

Phascolosoma albidum, Th., er vel neppe andet end unge Exemplarer af Ph. margaritaceum, Sars; thi jo yngre Individerne af denne Art ere, desto færre ere Tentaklerne, og desto mere gjennemsigtig er Huden. Théel siger ogsaa selv, at dersom ikke Danielssen havde angivet indtil 50 Tentakler for Ph. margaritaceum, vilde han ikke have betænkt sig paa at slaa albidum sammen med denne. Og hvad nu Phascolosoma fulgens, Th., betræffer, saa adskiller den sig saa lidet fra albidum, at vi have vanskeligt for at se en særskilt Art i den. Vi ere tilbøielige til at tro, at

is undeniable that this species exhibits greater variations than Ph. Strombi; but for us the requisites for the formation of a new genus appear to be greater; as we are of opinion that the differences, which should sanction a new genus, must not be a few external or internal deviations from the main type, but must be of a nature to enter more deeply into the organism.

Now as regards the new species of the genus Phascolion, we have reason to assume that they are only varieties of Ph. Strombi. We have established a variety under the name Ph. Strombi var. verrucosum, which undoubtedly coincides with Ph. tuberculosum Théel; and the reason why we did not form a new species of it, was simply that we met with several transition-specimens approaching more or less nearly to the main form.

Phascolion spitsbergense Th. has so much in common with specimens that we have from Vadsø, and which are manifestly not new species, but only varieties of Strombi, that we also entertain doubts as to its being maintained as an independent species. We can however not go further than expressing our doubt and justifying it as well as possible; for we have not been in possession of Mr. Théels original specimens.

Now we shall notice the new species of the genus Phascolosoma, which Mr. Théel has established.

Phascolosoma luteum Th. is certainly, as Dr. Théel himself supposes, Kefersteins margaritaceum, which is entirely different from Sars' margaritaceum — so far it is quite in order that Théel has given a new name to the species. But as Ph. luteum Th. and margaritaceum Keferst. coincide with Forbes' Ph. (Syrinx) Harveii, we are of opinion that Ph. luteum must fall into the ranks of the synonyms.

Phascolosoma dubium Th. has been found by Dr. Théel to be uncertain — as also implied by the name — Mr. Théel says it resembles Kefersteins elongatum and Blainville's vulgare, differing from these however by a slightly greater number of tentacles, and by the absence of two pigmentary spots (ocellæ). Now the number of tentacles varies very much; and the pigment usually disappears rather rapidly, when specimens are kept in spirit; as likewise there is great probability that specimens of this species may be found in which the pigmentary spots are wanting, — such is at least the case with Ph. margaritaceum Sars. We presume therefore that Ph. dubium coincides with Ph. elongatum Keferst. and Ph. vulgare Blainville.

Phascolosoma albidum Th. is probably nothing else than young specimens of Ph. margaritaceum Sars; for the younger the individuals of this species are, the fewer are the tentacles and the more transparent is the skin. Théel says also himself that if Danielssen had not indicated up to 50 tentacles for Ph. margaritaceum, he would not have hesitated to place albidum together with it. And as regards Phascolosoma fulgens Th., it differs so slightly from albidum, that it is difficult to see in it a distinct species. We are inclined to think that both these species are

begge disse Arter ere yngre Individer af Ph. margaritaceum, S., eller i det høieste Localitets-Varieteter af denne.

Under Navnet Ph. pyriforme, Danielss., har Hr. Théel givet en Beskrivelse af en Phascolosoma-Art, der ikke er Danielssens pyriforme; thi denne afviger saa væsentlig fra Phascolosoma, at vi for den have dannet en ny Slægt, nemlig Onchnesoma. Derimod have vi Grund til at antage, at Hr. Théels Ph. pyriforme falder sammen med den af Professor Möbius beskrevne og afbildede Ph. procerum.[1])

Endelig skulle vi omtale de af Dr. Théel beskrevne Generationsorganer, der fuldkommen svare til de af os beskrevne traadformige, bugtede Legemer, et ved hver Bugretractors Basaldel, og hvori vi stundom have fundet Æg i forskjellige Udviklingsstadier.

Ogsaa Semper har gjort opmærksom paa disse Organer og fremsat den Formodning, at de muligens vare Genitalkjertler. At disse Legemer ikke ere Æggestokke eller Testikler, ere vi overbeviste om. Vi have paavist hos mange Phascolosoma-Arter Generationsorganerne og henvise forøvrigt dertil; kun skulle vi bemærke, at de traadformige, bugtede Legemer, som Hr. Théel angiver for Kjønsorganer, ofte mangle. Saaledes findes de ikke hos Ph. squamatum, Onchnesoma Steenstrupii og Sarsii, og heller ikke hos Tylosoma. Derimod have vi hos Ph. squamatum fundet Kjønsorganet fæstet til Spiserøret paa samme Maade, som vi have angivet for flere andre Phascolosoma-Arter.

Dr. Teuschers Iagttagelser over Sipunculiderne stemme i de fleste Punkter overens med vore, — kun i et Par ere de temmelig afvigende, nemlig med Hensyn til Hudlegemerne og Generationsorganerne. Dr. Teuscher antager Hudlegemerne for at være Sandseorganer; heri kunne vi ikke være enige, idet vi have paavist, at de ere slimafsondrende Organer. Kjønsorganerne angiver han for Sipunculus's Vedkommende at være de Længdekanaler, som findes i Huden, og som dannes derved, at i den midterste Del af Kropsvæggen er Hudens Bindevævslag sammenvoxet med Ringmusculaturen kun paa de Steder, hvor Længdemusklerne løbe under Ringmusklerne. I disse Længdekanaler har han fundet Æg i forskjellige Udviklingsstadier og mener derfor, at de udvikles der. For Phascolosoma's Vedkommende antager han det for sandsynligt, at Æggene fremstaa af det Epithel, der beklæder Kropshulheden. Saavel med Hensyn til Længdekanalerne som Generationsorganerne have vi tidligere udførligt udtalt os.

[1]) Die Expedition zur physikalisch-chemischen und biologischen Untersuchungen der Nordsee im Sommer 1872. Pag. 175, Taf. 3, Fig. 1—5.

young individuals of Ph. margaritaceum S. or at most local varieties of the same.

Under the name Ph. pyriforme Danielss., Mr. Théel has given a description of a sort of Phascolosoma which is not Danielssens pyriforme; for this differs so essentially from the genus Phascolosoma, that we have formed for it a new genus Onchnesoma. But we have reason to suppose, that Mr. Théel's Ph. pyriforme coincides with the Ph. procerum [1]) described and delineated by professor Möbius.

Finally we must notice the organs of generation described by Dr. Théel, which correspond perfectly to those filiform and sinuous bodies described by us, one at the basal part of each ventral retractor, and wherein we have sometimes found ova in different stages of development.

Also Semper has drawn attention to these organs, and emitted the opinion that they were possibly genital glands. That these bodies are not ovaries nor testicles, we are convinced. We have pointed out the organs of generation in many species of Phascolosoma, and refer thereto; — we shall only remark that the filiform, sinuous bodies, indicated by Mr. Théel as sexual organs, are often wanting. Thus they are not found in Ph. squamatum, Onchnesoma Steenstrupii and Sarsii, nor in Tylosoma. On the other hand we have found in the Ph. squamatum the sexual organ attached to the oesophagus, in the same manner as we have indicated for several other species of Phascolosoma.

The observations of Dr. Teuscher on the Sipunculidæ agree in most points with ours — only in a few points they are rather different, namely with respect to the cuticular bodies and the organs of generation. Dr. Teuscher supposes the cuticular bodies to be organs of sense. To this we cannot agree; as we have shewn that they are organs, which secrete mucus. The organs of generation are stated by him, in reference to the Sipunculus, to be the longitudinal canals, which are found in the skin, and which are formed by the layer of connecting tissue of the skin in the central part of the wall of the body, being only connate with the annular muscular system at the places, where the longitudinal muscles run under the annular muscles. In these longitudinal canals he has found ova in various stages of development, and is therefore of opinion that the ova are here developed. As regards the Phascolosoma, he considers it probable that the ova are produced from the epithelium, which lines the perivisceral cavity. We have previously given our opinion explicitly concerning the longitudinal canals, as well as concerning the organs of generation.

[1]) Die Expedition zur physikalisch-chemischen und biologischen Untersuchungen der Nordsee im Sommer 1872. Pag. 175, Taf. 3, fig. 1—5.

Til Slutning skulle vi gjøre opmærksom paa, at vi i „Nature“ [1]) have fundet en Notits fra Challenger-Expeditionen, hvori en Gephyré ganske kortelig omtales, og som Dr. von Willemoes-Suhm har kaldt Leioderma. Beskrivelsen er saa lidet fuldstændig, at vi ikke kunne gjøre os nogen Forestilling om, hvormeget denne Slægt nærmer sig vor Tylosoma, og vi have derfor ikke kunnet gjøre nogen udtømmende Sammenligning; men det forekommer os dog, at de komme til at staa hinanden nær.

[1]) Nature, 1873, Vol. VIII p. 28 & 29.

Finally we must remark that we have found in „Nature“ [1]) a notice from the Challenger Expedition, wherein there is a very short mention of a Gephyreæ which Dr. von Willemoes-Suhm has called Leioderma. The description is so far from complete, that we have not been able to form any idea how far this genus resembles our Tylosoma, and we have therefore not been able to make any exhaustive comparison; but it appears to us that they will prove to be nearly connected.

[1]) Nature, 1873, Vol. VIII, p. 28 & 29.

EN NY ART
AF
SLÆGTEN PENNELLA.
AF
J. KOREN & D. C. DANIELSSEN.

PENNELLA BALÆNOPTERÆ, Nob.
(Tab. 16, Fig. 1—9).

I lange Tider henstod i Bergens Museum en Stump af en Pennella, der ifølge Korens Meddelelser var funden paa et varmblodigt Dyr, nemlig Balænoptera rostrata, Fabr. Ved Naturforskermødet i Christiania 1844 foreviste Korens Medarbeider og Ven, Baron M. W. v. Düben, et lignende Stykke, som ogsaa var uden Hovedpartiet, — og knyttede nogle Bemærkninger dertil. Nogle Aar senere fik vi et helt Exemplar, som vi da undersøgte, lod tegne og kaldte det Pennella Balænopteræ. Med dette Navn har det staaet i Museets Samlinger mindst i 20 Aar. Efterhaanden ere flere komne til.

I Steenstrups og Lütkens Skrift over det aabne Havs Snyltekrebse og Lernæer have disse Forfattere beskrevet og afbildet en Pennella, der findes paa Døglingen (Hyperooden rostratus, Chem.), hvilken de have benævnt Pennella crassicornis. Dette er altsaa den anden Snyltekrebs, som er funden paa varmblodige Dyr. Den har nogen Lighed med vor Art; men efterat vi have kunnet ved Hjælp af Originalexemplarer anstille Sammenligninger, viser P. crassicornis sig dog at være forskjellig fra P. Balænopteræ, som vi nu skulle beskrive.

Den forreste Del, det egentlige Hovedparti, er noget bredere end langt, men nærmer sig forresten Kugleformen. Paa Hovedets øverste Del, der er plan-convex, iagttages en Mængde faste, glatte, næsten coniske Papiller, som ere størst til Siderne og blive mindre, jo nærmere de komme Centrum (Tab. 16, Fig. 7 a). Dette, som er lidt fordybet, er forsynet med en liden, rund Aabning (Mundaabningen). Papillerne strække sig mere henimod Bug- end Rygfladen, hvorved denne bliver noget længere end hin. Hvor Papillerne støde til Rygfladen, findes i Almindelighed et Par af dem at være meget fremragende, og danne ligesom Grændsen bagtil, eller, om man vil, en bagre Rand. Under denne er en temmelig dyb Grube, paa hvis nederste Rand sidde to meget korte Antenner, hvis yderste Led ere forsynede med en liden Klo (Tab. 16, Fig. 9 a); forøvrigt er den bagerste Flade glat, plan i Midten, men lidt hvælvet til Siderne. Den for-

A NEW SPECIES
OF
THE GENUS PENNELLA.
BY
J. KOREN & D. C. DANIELSSEN.

PENNELLA BALÆNOPTERÆ, Nob.
(Tab. 16, fig. 1—9).

For a long time there was in the Museum of Bergen a fragment of a Pennella, which, according to Koren's communication, was found on a warm-blooded animal, namely Balænoptera rostrata, Fabr. At the meeting of the Naturalists in Christiania in 1844, Koren's collaborator and friend, Baron M. W. von Düben, exhibited a similar fragment, which was likewise without the head-part, and presented some remarks in connexion with the same. Some years afterwards we obtained an entire specimen, which we then examined, delineated, and named Pennella Balænopteræ. Under this name it has stood in the collection of the museum for at least 20 years. Other specimens have gradually been added.

In Steenstrups and Lütkens work on the parasitical crustaces and Lerneæ of the open sea, these authors have described and delineated a Pennella which is found on the Hyperoodon rostratus, Chem., and which they have named Pennella crassicornis. This is therefore the second Lerneæ which has been found on warm-blooded animals. It has a great resemblance to our species; but after having been enabled by help of original specimens to institute comparisons, we find that P. crassicornis is nevertheless different from P. Balænopteræ, which we shall now proceed to describe.

The anterior part, the proper head-part, is somewhat broader than it is long, otherwise approaching to the globular form. On the upper part of the head, which is plano-convex, there appear a number of firm, smooth, nearly conical papillæ, which are largest at the sides, and become smaller the nearer they approach to the centre (Tab. 16, fig. 7 a). In the centre, which is slightly concave, there is a small circular aperture (the oral aperture). These papillæ extend more towards the ventral than towards the dorsal surface, whereby the latter becomes rather longer than the former. Where the papillæ join the dorsal surface, a pair of them usually are found to be very prominent, forming, as it were, the posterior limit, or, so to say, a posterior margin. Under the latter, there is a rather deep excavation, on the lower margin of which there are two very short antennæ, whose extreme joint is furnished with a little claw, (Tab. 16,

reste Flade er temmelig kort, noget convex, stundom lidt skulpteret (Tab. 16, Fig. 6 a), og her sees paa den øverste og midterste Del ligesom en Fure, der fremkommer derved, at de føromtalte Papiller her ere meget smaa i Forhold til dem, som findes paa Siderne (Tab. 16, Fig. 7 b). Fra Hovedets Grund, der altid er noget smalere end den øvrige Del, udgaar næsten horisontalt tre lange, temmelig tynde Horn, hvis frie Ende er afrundet (Fig. 1, 6, 7, 9). Af disse Horn, der ere Dyrets Fæsteapparat, udgaa to fra Siderne og et fra Ryggen.

Den forlængede Del, som er bleven kaldt Brystregionen (Thoraxregion), har en ganske overordentlig Længde, og tager sin Begyndelse fra Hornene, hvor den er meget tyk, noget fladtrykt forfra og bagtil, hvorved fremkommer en tydelig Bug- og Rygflade (Fig. 1, 6 c). Paa Bugfladens Midtparti findes 4 Par Fødder, af hvilke de to øverste Par staa tættere sammen end de underste (Fig. 1, 6 d). Omtrent 8—10 Mm. nedenfor Hornene bliver Brystdelen meget smal, er ganske rund og antager Formen af et Rør i en Længde af omtrent 180 Mm. (Fig. 1 e), hvor den atter bliver tykkere og indtager nu en betydelig Tykkelse ligetil den saakaldte Abdominaldel, (Fig. 1 f), det Sted nemlig, hvor Æggetraadene tage deres Udspring. Ogsaa denne tykkere Del er lidt fladtrykt forfra bagtil, og paa Bugfladen, langt nede, sees to runde Papiller, paa hvis Midte findes en fin, rund Aabning (Fig. 2 a, Heftepunkterne for Spermatophorerne?). Strax under tage Æggetraadene deres Udspring, (Fig. 2 b); de ere meget længere end hele Dyret. Nedenfor Genitalporerne er da den Del, der er bleven benævnt Abdomen; den er temmelig kort i Forhold til Brystpartiet, er mindre tyk end dettes nederste Del og bliver smalere ned imod den afstumpede Ende (Fig. 1 g), hvor der til hver Side findes en fremragende Papille (Furcalglieder, Claus, Fig. 5 b). Imellem disse Papiller iagttages en Fure, i hvis Midte er en temmelig fin Aabning, forsynet med en Ringmuskel (Analaabningen). Paa hver Side af Abdominaldelen findes en Række hornagtige Appendices, mindst 24 i Tal. Ethvert saadant Tilhæng, der udgaar fra en rund, gjennemboret Knude (Fig. 5 a), har en kort Stamme, hvorfra udspringe jævnligen 3 korte Hovedgrene, som dele sig i 3 eller flere lange udelte Grene (Fig. 8); denne Del faar saaledes nogen Lighed med Fjæren paa en Skriverpen. Dyret er omgivet af en tyk, fast, halvgjennemsigtig Chitinhud, hvis ydre Flade overalt er glat, naar undtages paa Rygsiden af den tykkere, nederste Del af Brystpartiet samt Abdominaldelen, hvor den er ligesom rynket paatvers. Den indre Flade beklædes af en Cuticula, der er hyalin, meget finstribet, men forøvrigt uden nogen anden Structur. Indenfor denne findes en temmelig tyk, næsten sortfarvet Hud, der indeslutter alle de indre Organer, forlænger sig ind i Hornene, beklæder den indre Væg af Hovedet og gaar i Abdominaldelen igjennem fine Aabnin-

fig. 9 a); otherwise the posterior surface is smooth, plane in the middle, but a little convex at the sides. The anterior surface is rather short, somewhat convex, occasionally a little sculptured (Tab. 16, fig. 6 a); and here, on the upper and central part, we see, as it were, a furrow, occasioned by the before-mentioned papillæ being at this place very small in proportion to those on the sides (Tab. 16, fig. 7 b). From the base of the head, which is always somewhat smaller than the remaining part, there proceed nearly horisontally three long, rather thin horns, the free extremities of which are rounded off (fig. 1, 6, 7, 9). Of these horns, which form the animal's apparatus of attachment, two proceed from the sides, and one from the back.

The elongated part, which has been called the thoracic region, has quite an extraordinary length, and takes its beginning from the horns; being at first very thick, somewhat flattened from in front backward, thus producing distinct ventral and dorsal surfaces (fig. 1, 6 c). In the middle part of the ventral surface, there are 4 pairs of feet, of which the two upper pairs stand closer together than the two lower (fig. 1, 6 d). About 8—10 Mm. below the horns, the thoracic part becomes very slender; it is quite round, and takes the form of a tube for a length of about 180 Mm. (fig. 1 e), when it again becomes thicker, and occupies now a considerable thickness as far as to the so-called abdominal part (fig. 1 f), namely to the place whence the ovisacs take their origine. Also this thicker part is a little flattened from in front backward; and on the ventral surface, far down, there appear two round papillæ, in the middle of which there is a minute circular aperture (fig. 2 a, the points of attachment for the Spermatophores?). Immediately below, the ovisacs take their origine (fig. 2 b); they are much longer than the whole animal. Below the genital pores, there comes then that part which has been called the abdomen; it is rather short in proportion to the thoracic region, less thick than the lower part of the latter, and becomes smaller down towards the rounded extremity (fig. 1 g), where on each side there is a projecting papilla (Furcalglieder, Claus) (fig. 5 g). Between these papillæ, there is observed a furrow, in the middle of which there is a rather minute aperture provided with an annular muscle (the anal aperture). On each side of the abdominal part, there is a row of horny appendices, at least 24 in number. Each of these, proceeding from a round, perforated tubercle (fig. 5 a), has a short stem, whence there issue regularly 3 short main branches, which divide themselves into 3 or more long, undivided branches (fig. 8). This part acquires thus some resemblance to the feather on a quill pen. The animal is enveloped in a thick, solid, semi-transparent, chitinous integument, the exterior surface of which is everywhere smooth, except only on the dorsal side of the thicker, lower part of the thoracic region, and the abdominal part, where it is, so to say, corrugated transversely. The interior surface is covered with a cuticle, which is hyaline, very finely striped, but otherwise without

ger ind i de hornagtige Appendices. Denne Hud dannes af flere Lag eller Membraner, der ere temmelig fast hæftede til hverandre og vanskelig lade sig adskille. Den ydre Membran (Hypodermis, Claus) er temmelig tynd, har en cellet Structur og er optaget af en stor Masse Pigmentklumper. Dette Pigment, der har en smuk dyb violet Farve, er især rigt og tæt afsat paa den nederste og tykkere Brystdel samt Abdominaldelen, hvor det ligesom ringformigt afleirer sig, svarende til de i Chitinhuden tidligere omtalte Rynker. Paa den smalere Brystdel bliver Pigmentet tyndere og findes kun sparsomt paa Hovedet og i Hornene, medens det derimod er rigere i Abdominaltilhænget. Den indre Membran, der er endnu tyndere end den ydre, er næsten gjennemsigtig, har en fibrillær Bindevævsstructur, hvori sparsomt kjerneholdige Celler ere indleirede. Denne Membran fæster sig til Tarmens Sider og beklæder dens hele bagerste Flade, hvorved der fremkommer et næsten trekantet Rum, der indtager Dyrets hele Rygflade, og som i levende Live er fyldt med rødt, tyndtflydende Blod. Det er ogsaa en Forlængelse af denne indre Membran, der beklæder som et Peritoneum ikke alene den forreste Flade af Tarmen, men ogsaa de øvrige indre Organer og bidrager derved til at befæste disse. Imellem disse to Membraner eller Lag er da det egentlige Hudparenchym, der bestaar af et temmelig stærkt Bindevæv, hvori findes et udbredt Kanalsystem [1]) og større og mindre Fedtlag.

Den føromtalte Rygkanal er paa den tykkere og nederste Brystdel meget vid, indtager hele Tarmens Bredde, medens den opad bliver yderst smal, og har paa den lange, smale Brystdel et saa ringe Lumen, at et Hestehaar vanskeligen kan indbringes deri. I Abdominaldelen bliver Kanalen ogsaa meget smalere, men dog ikke saa smal som i Brystdelen. I denne lange Rygkanals Sidevægge sees en Mængde yderst fine Spalter, der føre ind til det ovennævnte sarcodelignende Bindevæv, hvis fine forgrenede Kanaler sandsynligvis tjene som Circulationsgange for Blodet.

Det omtalte Fedtlag er paa de fleste Steder ikke meget tykt, omend det kan danne enkelte Fedthobe; men paa den øverste Brystdel, ligesom i Hovedet og Hornene, danner det et tykt Polster, der udfylder disse Dele. Fedtlaget er sammensat af Fedtceller, der tildels ere forgrenede, det vil sige, der findes en eller flere Udløbere paa Cellen.

Tarmkanalen begynder fra den tidligere omtalte

[1]) Claus omtaler et lignende Kanalsystem hos Lernaeocera esocina Pag. 9, Tab. 1, Fig. 8. Beobachtungen über Lernaeocera, Peniculus und Lernaea von Professor B. Claus. Marburg 1868.

any other structure. Inside of this there is a rather thick, nearly black-colored cutis, enclosing all the interior organs, extending into the horns, lining the interior wall of the head, and going, in the abdominal part, through minute apertures into the plumose filaments. The cutis is formed of several layers or membranes, which are rather firmly attached to one another, and are difficult to separate. The exterior membrane (Hypodermis, Claus?) is rather thin, has a cellular structure, and contains a great quantity of pigment in lumps. This pigment, which has a beautiful, deep violet color, is richly and densely deposited, especially on the lowest and thicker thoracic region; as also in the abdominal part, where it appears to lie in rings answering to the corrugation in the chitinous integument previously noticed. On the narrower thoracic part, the pigment becomes thinner, and appears only sparsely in the head and horns; while, on the contrary, it is more abundant in the plumose filaments. The interior membrane, which is still thinner than the exterior, is nearly transparent, has a fibrillous structure of connecting tissue, wherein are imbedded cells containing nuclei. This membrane is attached to the sides of the intestine, covering the whole of the latter's posterior surface, whereby there is produced a nearly triangular space, which occupies the whole of the animal's dorsal surface, and which during life is full of red, thinly flowing blood. It is also a continuation of this interior membrane which covers, like a peritoneum, not only the anterior surface of the intestine, but also the other internal organs, and contributes thereby to attach them. Between these two membranes or layers, is the proper cuticular parenchym consisting of a rather strong connecting tissue, in which there is found an extensive vascular system [1]), and larger and smaller layers of adipose.

The dorsal canal previously noticed, is, in the thicker and lowest thoracic part, very wide, occupying the whole breadth of the intestine, while upwards it becomes extremely narrow, and has on the long, narrow, thoracic part so minute a lumen, that it would be difficult to insert a horse-hair. In the abdominal part, the canal becomes also much narrower, but still not so narrow as in the thoracic part. In the lateral walls of this long dorsal canal, there appear a number of extremely fine fissures leading into the sarcode-like connecting tissue; the minute ramified canals of which serve probably as passages for the circulation of the blood.

The layer of adipose matter noticed, is in most places not very thick, although it can form isolated fatty agglomerations; but in the upper thoracic part, as also in the head and horns, it forms a thick stuffing filling these parts. The adipose layer is composed of cells of fat, which are partly ramified, that is to say, we find one or more ramifications on the cell.

The intestinal canal begins from the oral aperture

[1]) Claus notices a similar system of vessels in the Lernaeocera esocina, pag. 9, Tab. 1, fig. 8. Beobachtungen über Lernaeocera, Peniculus und Lernaea, von Professor B. Claus. Marburg 1868.

Mundaabning, paa Midtpartiet af Hovedet, med en sækformig Udvidning (Svælget), der er omtrent 4 Mm. lang og 3 Mm. bred, bliver derefter meget smal, omtr. 1 Mm., igjennem den lange smale Brystdel, indtil den kommer ned imod dennes tykkere Parti, hvor den atter udvider sig meget betydeligt (Maven); saa at den her i en Længde af 46 Mm. har en Tykkelse af omtrent 3 Mm. Fra Abdominaldelens Begyndelse bliver den igjen smal, omtr. 1,5 Mm. (Tarm) og aftager nu i Tykkelse, til den aabner sig i Anus. Tarmrøret bestaar af en yderst tynd Membran, som er den før beskrevne Peritonealhinde, en Muskelhud, der dannes af to Lag stærke Muskler, nemlig Ringmusklerne, det ydre, og Længdemusklerne, det indre Lag. Disse Lag ere saaledes ordnede, at Tarmrøret under en svag Forstørrelse i Mikroskopet har et gittret Udseende. Saavel fra Ring- som Længdemusklerne udgaa enkelte Fibre, der anastomosere med Sidebundterne. Indenfor Muskelhuden findes især paa Tarmrørets tykkere Del et Lag, der indeholder en Mængde aflange, forgrenede Legemer, som have et temmelig mørkegult, kornet Indhold. Paa Spiserøret ere disse Legemer yderst sparsomme, hvorimod her iagttages andre rundagtige Legemer, ganske svarende til de af Claus benævnte Tarmceller, der ere fyldte med fine, glindsende Korn. Tarmrørets indre Flade er overalt forsynet med et kjernerigt Celle-Epithel. Hele Tarmrøret har et lige Løb efter Dyrets Længde, er fæstet ved en Mængde tynde Muskelfibre til den af os tidligere beskrevne indre Membran af Huden, — dets bagerste Flade bidrager til at danne Bunden af den lange Rygkanal.

Generationsorganerne bestaa af Æggestokke med deres Udførselskanal, Cementkjertlerne med deres Udførselsgang, Æggetraadene og endelig to korte Kanaler.

Æggestokkene, der have sit Leie en paa hver Side af Tarmrøret, just der hvor dette udvider sig i Brystdelen, dog nærmere Rygfladen, — have en flad og langstrakt Figur, ere 8 Mm. lange, 2,5 Mm. brede. De bestaa af et temmelig smalt Rør, der begynder med en blind Ende og danner en Mængde paa hinanden liggende Slyngninger, som ere forenede ved et temmelig fast Bindevæv. Dette Rør er paa hele den indre Flade beklædt med et kjernerigt Celle-Epithel og fyldt med Æggeceller. Paa den øverste Ende af Æggestokkene sees Røret at antage en Korktrækkerform, idet det her gaar over i Oviducten. Denne er næsten cylinder-rund, har en Længde af 45 Mm. og en Tykkelse af 1 Mm., og ender lige ved Abdominaldelens Begyndelse, hvor den fortsætter sig i Æggetraadene.

Saavel Æggestokkene som Oviducten ere beklædte af Peritonealhinden. Ifølge vore Observationer ere vi tilbøielige til at samstemme med Professor Claus deri, at

previously noticed, in the middle part of the head, with a sack-like enlargement (the gullet) which is about 4 Mm. long and 3 Mm. broad, becoming then very narrow, about 1 Mm. through the long narrow thoracic part, until it comes down towards the thicker part of the thoracic region, where it again widens very considerably (the stomach); so that it has here, for a length of 46 Mm., a thickness of about 3 Mm. From the commencement of the abdominal part, it becomes again narrow, about 1,5 Mm. (intestine), and diminishes now in thickness, until it opens into the anus. The intestinal canal consists of an extremely thin membrane, which is the peritoneal membrane previously described, a muscular skin formed of two layers of strong muscles, namely the annular muscles forming the exterior layer, and the longitudinal muscles the interior. These layers are so arranged as to give to the intestinal canal a latticed appearance, when it is seen, slightly magnified, through a microscope. From the longitudinal muscles, as well as from the annular muscles, there proceed single fibres, which anastomose with the lateral fascicles. Within the muscular skin, there is found, especially on the thicker part of the intestinal canal, a layer containing a number of oblong ramified bodies, which have a rather darkish yellow content. On the oesophagus these bodies are extremely sparse; while here we observe other roundish bodies corresponding entirely to those called by Claus intestinal cells, which are filled with minute shining granules. The inner surface of the intestinal canal is everywhere provided with a nucleus-like cell-epithelium. The whole intestinal canal has a straight course along the length of the animal; it is attached by a number of thin muscular fibres to the inner membrane of the skin previously described by us; its posterior surface contributes to form the bottom of the long dorsal canal.

The organs of generation consist of ovaries with their excretion-canal; cement-glands with their excretions-canals, ovisacs; and finally two short canals.

The ovaries, which have their situation, one on each side of the intestinal canal, precisely where the latter expands itself in the thoracic part, and nearer to the dorsal surface, have a flat and elongated figure; they are 8 Mm. long, and 2,5 Mm. broad. They consist of a rather narrow tube, which commences with a closed extremity, and forms a number of superincumbent circumvolutions united by a rather solid connecting tissue. This tube is, on the whole of its interior surface, lined with a cell-epithelium abounding in nuclei and filled with egg-cells. On the upper extremity of the ovaries, the tube is seen to assume a cork-screw form, going over here into the oviduct. The latter is nearly cylindrical; it has a length of 45 Mm. and a thickness of 1 Mm., and terminates just at the commencement of the abdominal part, where it is continued in the ovisacs.

The ovaries, as well as the oviduct, are covered by the peritoneal membrane. According to our observations, we are inclined to agree with Professor Claus, that the

Æggene dannes i det ovenbeskrevne Rørs Epithel, da vi iagttog, at i en sammenhængende Gruppe af disse Epithelceller vare nogle af dem næsten omformede til Æggeller, imedens de andre vare uforandrede. Æggetraadene manglede hos de fleste af de Exemplarer, vi have undersøgt, kun hos et Par vare de hele, og her viste de sig at være tynde som en nogenlunde fin Sytraad. — Cementkjertlerne (Kitkjertlerne) ligge tæt ved Siden af den udvidede Del af Tarmrøret (Maven), saaledes at dette ligger imellem dem. De ere noget dækkede af Oviducterne, nærme sig mere Bugfladen end disse, ere 42 Mm. lange, 1,5 Mm. brede, have en meget fladtrykt Form, ere glatte og af en melkehvid Farve. Fra deres øverste Ende tager Udførselsgangen, der er rund og fyldt af Cement, sin Begyndelse, og løber da slyngeformigt ned imod det Sted, hvor Oviducten gaar over i Æggetraaden; her udmunder Udførselsgangen for Cementorganet i Oviducten. Baade Cementkjertlerne og deres Udførselskanal ligge omgivne af Peritoneum.

Paa flere af de Exemplarer, vi undersøgte, har der vist sig flere Uregelmæssigheder med Hensyn til Cementorganerne. Saaledes var paa et Exemplar begge Cementkjertlernes øverste Ender sammenvoxne, og derfra udgik kun en Udførselsgang, som var meget tyk (Fig. 4 a); men nogle Millimeter længere nede delte denne sig i to Grene, hvoraf hver indtog sit sædvanlige Leie (Fig 4 b, b). Den ene af disse Grene deler sig atter i to Grene (Fig. 4 c, c), hvilke, efter i en Længde af omtrent 40 Mm. at være adskilte, smelte sammen til en Kanal (Fig. 4 d), der da paa almindelig Vis udmunder i Oviducten. Denne sidste Deling af Udførselsgangen fandt vi at være tilstede paa 4 af de 6 Exemplarer, vi undersøgte, saa det tør maaske hænde, at denne Ordning er den almindeligste.

Paa Oviductens nederste Del, lidt ovenfor det Sted, hvor Cementkjertelens Udførselsgang udmunder, sees paa hver Side en temmelig tynd og kort Kanal, der gaar ud i de paa Bugfladen tidligere beskrevne Papiller. Foruden de føromtalte Muskler findes der i Hovedet et temmelig sammensat Muskelapparat. Paa hver Side af Svælget iagttoges en stor Mængde stærke Muskler. Hver Muskel tager sit Udspring med en tydelig Tendo, fæstet i den indvendige Hulhed af en Knude, og gaar saa paatvers vifteformigt henimod den indvendige Væg af Hovedets Chitinhud. Disse Muskler ere i saa stor Mængde tilstede, at de ganske udfylde Hovedets Side- og Bag-Partier. Nærmest Svælget sees paa begge Sider flere længere Muskler, der fæste sig paa Spiserøret og have et fast Punkt ligeledes i de Knuders Hulhed, der nærmest omgive Mundaabningen. Fibrillerne i disse Muskler ere stribede paatvers.

Nervesystemet udgaar fra to store aflange Ganglier, der have deres Sæde paa Bugsiden af Svælget og ere sammensmeltede i Midten. Fra disse Ganglier udløber en temmelig tyk Hovedstamme, der følger Spiserøret til

ova are formed in the epithelium of the tube above described; as we remarked that in a continuous group of these epithelial cells, some of them were nearly transformed into egg-cells, while the others were unchanged. The ovisacs were wanting in most of the specimens we examined: only in a few, they were entire; and here they proved to be as thin as a rather fine sewing-thread. The cement-glands lie close to the side of the enlarged part of the alimentary canal (the stomach), so that the latter lies between them. They are to some extent covered by the oviducts, and are nearer to the ventral surface than the oviducts are; they are 42 Mm. long, 1,5 Mm. broad; their form is much flattened; they are smooth and of a milk-white color. From their upper extremity, the excretion-canal, which is round and full of cement, takes its beginning, and then runs sinuously down towards the place where the oviduct goes over into the ovisac; here is the disemboguement of the excretion-canal for the cement-organ in the oviduct. The cement-glands and their excretion-canal are surrounded by the peritoneum.

In several of the specimens which we examined, there appeared many irregularities with respect to the cement-organs. Thus in one specimen, the upper extremities of both the cement-glands were connate; and there issued from the same only one excretion canal, which was very thick (fig. 4 a); but some millimeters lower down, it divided itself into two branches, each of which occupied its usual bed (fig. 4 b, b). One of these branches separates again into two branches (fig. 4 c, c), which, after having been separate for a length of about 40 Mm., coalesce in a canal (fig. 4 d) which then, in the usual manner, has its issue in the oviduct. This last division of the excretion-canal was found to exist in 4 of the 6 specimens we examined; so that it may be that such is the more ordinary arrangement.

On the lowest part of the oviduct, a little above the place where the excretion-canal of the cement-glands has its orifice, there is on each side a rather slender and short canal going out into the papillæ, previously described, on the ventral surface. Besides the muscles before noticed, there is in the head a rather complex muscular apparatus. On each side of the gullet, there appear a great number of strong muscles. Each muscle takes its beginning with a distinct tendon, attached in the interior cavity of a tubercle, and then goes transversely fan-like towards the interior wall of the chitinous integument of the head. The muscles are present in such great numbers, that they entirely occupy the lateral and posterior parts of the head. Nearest to the gullet, there appear on both sides several longer muscles attached to the oesophagus and having likewise a fixed point in the cavity of the tubercles which most closely sorround the oral aperture. The fibrillæ in the muscles are striped transversely.

The nervous system proceeds from two large oblong Ganglia situated on the ventral side of the gullet and coalescing in the middle. From these ganglia, there issues a rather thick main trunk, which accompanies the

nedimod dettes udvidede Del (Maven), hvor den deler sig i to stærke Grene, en til hver Side, hvilke igjen forene sig i et temmelig stort Ganglion, strax nedenfor det Sted, hvor den egentlige Tarm tager sit Udløb. Fra dette Ganglion udgaar foruden Hovedstammen, der langs Tarmen fortsætter sit Løb til dennes Ende, en Mængde mindre Grene til de omkringliggende Dele. Paa de Grene, der løbe ved Siden af den udvidede Tarmdel, findes flere mindre Ganglier. Saavel fra disse, som fra selve Grenene, udgaa en stor Mængde mindre Grene dels til Maven, dels til Huden (ikke Chitinhylstret) og dels til Generationsorganerne. Ogsaa paa disse Smaagrene ere Ganglier, der ved deres Grene anastomosere med hinanden og danne udbredte Nerveplexuser. Paa den øverste Del af Bugstrengen saae vi ingen Ganglier, men mange Sidegrene, som gik til Spiserøret og den dette omgivende Hud. Bugstrengen tilligemed dens Grene have en yderst finstribet Structur, imedens der i Ganglierne findes mange Ganglieceller med deres Udløbere.

Hanner af Dyret have vi ikke iagttaget.

Pennella Balænopteræ findes paa Vaagehvalen (Balænoptera rostrata, Fabr.), i Nærheden af Kjønsorganet. Stundom forekomme flere paa et Dyr; men i det Hele taget er dens Forekomst sjelden. Den borer sig fra 1—3 Tommer ind i Spækket — kommer aldrig ind til Kjødet — og danner derved tildels bugtede Gange. Hvor Hovedet og Hornene findes, der er Spækket ramolleret til en tyk Vællings Consistentse og i et Omfang af en lille Valnøds.

Paa denne vor Pennella snylter en Cirripede (Conchoderma virgata, Spengl.) meget hyppigt (Fig. 1 h), og det er ikke alene et enkelt Dyr; men ofte ser man paa den tynde Brystdel indtil 7 fuldvoxne Exemplarer, hvoraf enkelte indtage en Længde af 40 Mm.; hyppigst sidde de dog nede ved Æggetraadenes Begyndelse, hvor de ligeledes kunne danne en Klynge af 5—6 Exemplarer.

Vi have taget forskjellige Maal af to fuldvoxne Exemplarer.

	A.	B.
Dyrets hele Længde	320 Mm.	300 Mm.
Den smalere Brystdels Længde	195 —	190 —
„ — — Tykkelse	2 —	2 —
Den bredere Brystdels Længde	75 —	62 —
„ — — Tykkelse	6 —	6 —
Abdominaldelens Længde	45 —	42 —
Hovedets Længde	7 —	6 —
— Bredde	8 —	7 —
Hornenes Længde	15 —	14 —
— Tykkelse	2 —	2 —

Pennella Balænopteræ adskiller sig fra P. crassicornis, Steenstr. & Lütken, derved, at den er en halv Gang saa lang, har et mere fremtrædende Hoved, der er baade

oesophagus until down towards the enlarged part of the latter (the stomach), where it divides itself into two strong branches, one on each side, which again unite in a rather large ganglion immediately below the place where the proper intestine takes its issue. From this ganglion — besides the main trunk, which continues its course along the intestine to the extremity of the latter — proceed a number of smaller branches to the circumjacent parts. On the branches which run by the side of the enlarged part of the intestine, there are several smaller ganglia. As well from these as from the branches themselves, there issue a great number of smaller branches, partly to the stomach, partly to the skin (not the chitinous envelope), and partly to the organs of generation. Also on these small branches there are ganglia, which, by their branches, anastomose with each other, and form extended plexuses of nerves. On the upper part of the ventral cord, we did not perceive any ganglia, but many lateral branches going to the oesophagus and to the skin surrounding it. The ventral cord together with its branches, have an extremely fine-striped structure; while in the ganglia, there are many ganglionic cells with their ramifications.

We have not observed any males of this species.

Pennella Balænopteræ is found on the Vaage Whale (Balænoptera rostrata, Fabr.), in the vicinity of the organ of generation. Occasionally there are several on one animal; but, on the whole, its occurrence is rare. It bores itself from 1—3 inches deep in the blubber — never comes into the flesh — and sometimes, in so doing, forms sinuous passages. Where the head and the horns are found, there the blubber is softened to the consistence of a thick gruel, and to the extent of the circumference of a small walnut.

On this our Pennella, there very often subsists a parasite Cirripede (Conchoderma virgata, Spengl fig. 1 h), and it is not only a single animal, but we often find, on the thin thoracic part, as many as 7 full grown specimens, of which some have a length of up to 40 Mm.; they most frequently, however, are situated down at the commencement of the ovisacs, where they likewise can form a cluster of 5—6 individuals.

We have taken various measures of two full grown specimens.

	A.	B.
Whole length of the animal	320 Mm.	300 Mm.
Length of the narrower thoracic part	195 —	190 —
Thickness	2 —	2 —
Length of the broader thoracic part	75 —	62 —
Thickness	6 —	6 —
Length of the abdominal part	45 —	42 —
Length of head	7 —	6 —
Breadth - —	8 —	7 —
Length of horns	15 —	14 —
Thickness —	2 —	2 —

Pennella Balænopteræ differs from P. crassicornis, Steenstr. & Lütken, by being half as long again, and having a more advancing head, which is both broader

bredere og længere, samt derved at Hornene have en næsten horisontal Retning og ere meget tynde. (Paa P. crassicornis staar Ryghornet meget skraa nedad, næsten perpendiculært). — At Dyrets Indre ogsaa frembyder Forskjelligheder fra P. crassicornis, tør vi antage.

FORKLARING OVER FIGURERNE.

Tab. 16, Fig. 1. Penella Balænopteræ i naturlig Størrelse. *a* Hovedet; *b, b* Hornene; *c* Brystregionens bredere Del; *d* rudimentære Fødder; *e* den smale, forlængede Brystdel; *f* den nederste, udvidede Del af Brystregionen; *g* Abdominaldelen; *h* en snyltende Cirripede (Conchoderma virgata).

Fig. 2. Den nederste, udvidede Del af Brystregionen, forstørret. *a* Heftestedet for Spermatophorerne? *b* Æggetraaden.

Fig. 3. Den nederste, udvidede Del af Brystregionen, noget forstørret og aabnet.

Fig. 4. Samme Del, ligeledes aabnet. *a* Udførselsgangen for de sammenvoxede Cementkjertler; *b, b* de tvende Grene, hvori Udførselsgangen deler sig; *c, c* de tvende Grene, hvori den ene af disse Grene *(b, b)* deler sig; *d* Sammensmeltningen den sidste Deling til en Stamme.

Fig. 5. Abdominaldelen, noget forstørret; paa den ene Side blottet for de hornagtige Appendices. *a* gjennemboret Knude for et Tilhæng; *b* Furcalglieder (Claus).

Fig. 6. Hovedet og den øverste Del af Brystregionen, seet fra Bugsiden, forstørret. *a* Sculpteringer; *c* Bugfladen; *d* Fødderne.

Fig. 7. Hovedet med en Del af Brystregionen, seet fra oven, forstørret. *a* Knuder; *b* Furen.

Fig. 8. Hornagtige Appendices, forstørret.

Fig. 9. Hovedet med en Del af Brystregionen, seet fra Rygsiden, lidt forstørret. *a* Antenner.

and longer; also by the horns having a nearly horisontal direction and being very slender. (In P. crassicornis, the dorsal horn stands very much inclined downwards, nearly perpendicularly). We may assume that the interior of the animal also exhibits differences from P. crassicornis.

EXPLANATION OF THE FIGURES.

Tab, 16, fig. 1. Penella Balænopteræ, natural size. *a* the head; *b, b* the horns; *c* the broader part of thoracic region; *d* the rudimentary feet; *e* the slender, prolongated thoracic region; *f* the lower, enlarged part of thoracic region; *g* abdominal region; *h* Cirripede (Conchoderma virgata).

Fig. 2. The lower, enlarged part of thoracic region, magnified. *a* the points of attachment for the Spermatophores? *b* the ovisacs.

Fig. 3. The lower, enlarged part of thoracic region, opened, and somewhat magnified.

Fig. 4. The same part, likewise opened. *a* the excretion-canal for the connate Cement-glands; *b, b* the two branches of the excretion-canal; *c, c* the two branches into which one of the branches *(b, b)* devides itself; *d* the coalescense of the latter division in a canal.

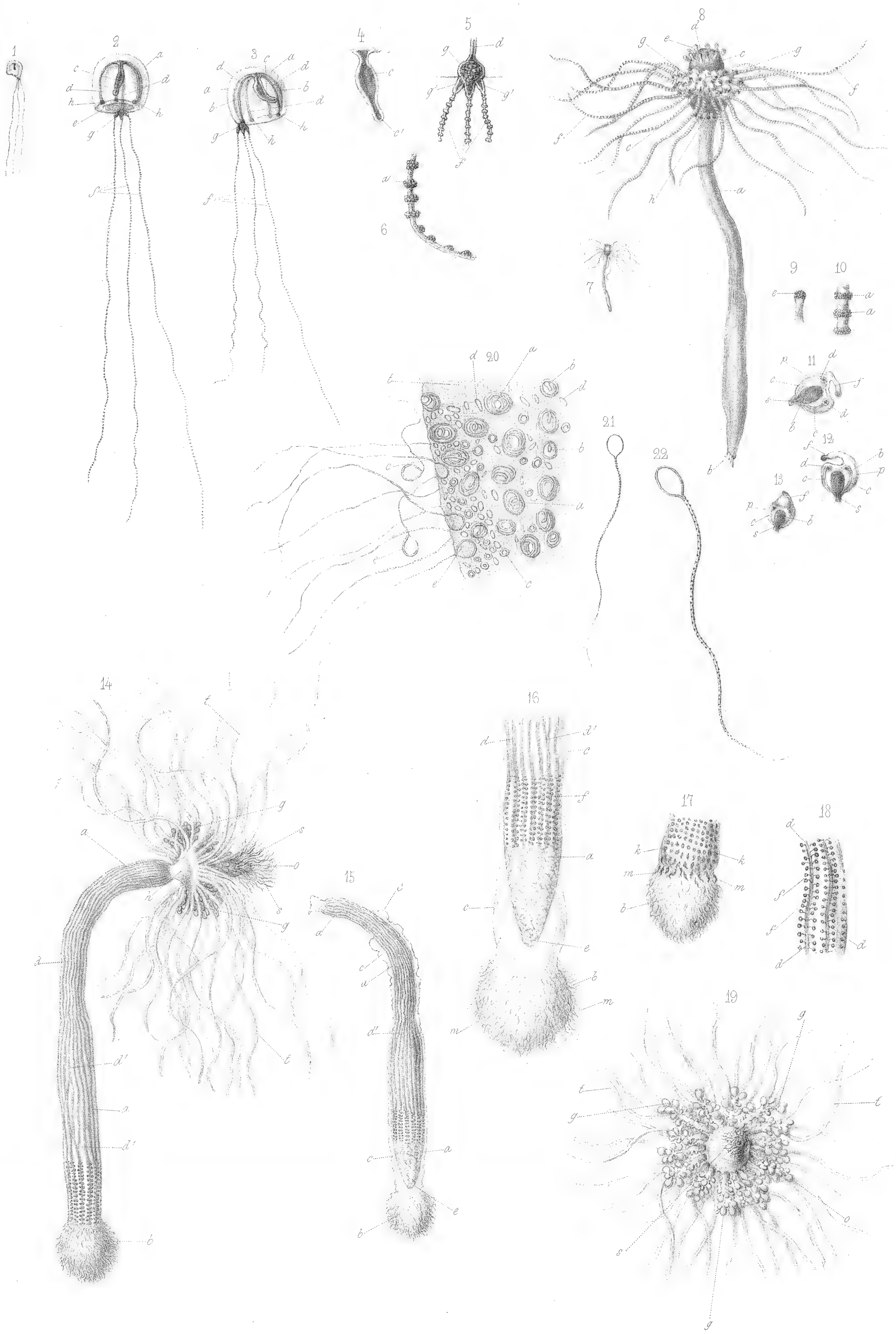
Fig. 5. Abdominal region, magnified; one side being without the horny appendices. *a* round, perforated tubercle; *b* Furcal glieder (Claus).

Fig. 6. The head and the upper part of thoracic region, ventral aspect, magnified. *a* sculptured part; *c* ventral surface; *d* feet.

Fig. 7. The head, with a part of thoracic region, frontal aspect, magnified. *a* papillæ; *b* furrow.

Fig. 8. Plumose filaments, magnified.

Fig. 9. The head, with. a part of thoracic region, dorsal aspect, magnified. *a* antennæ.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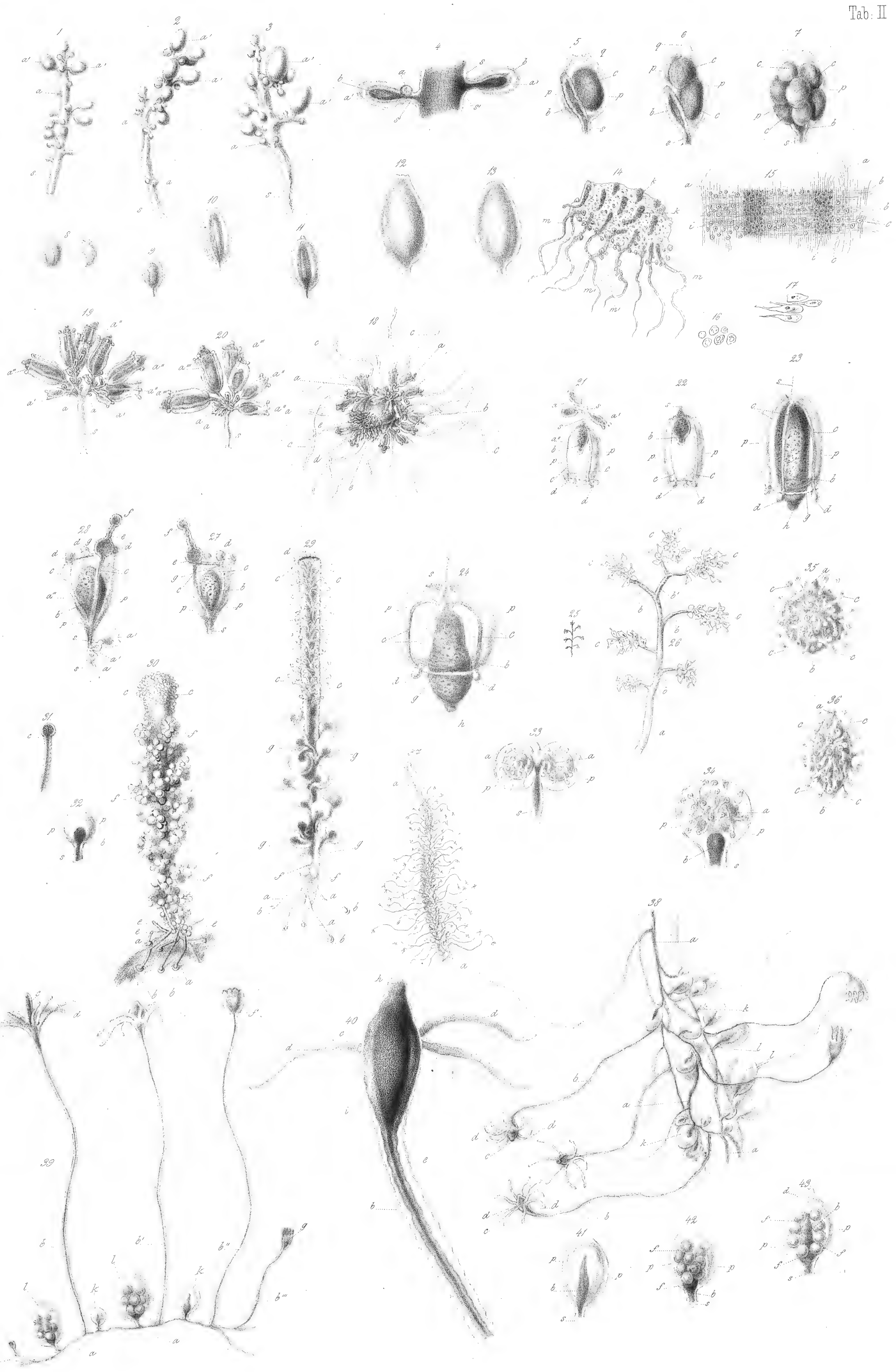

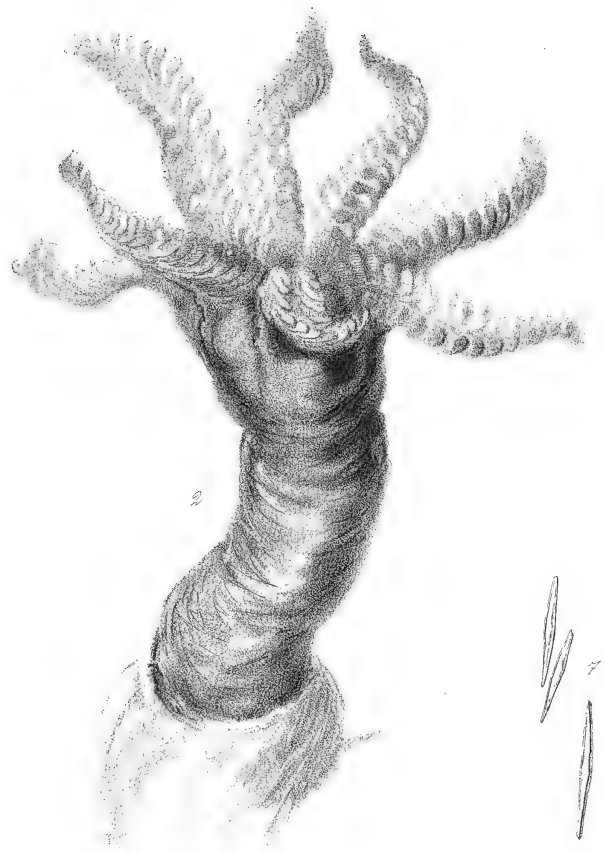
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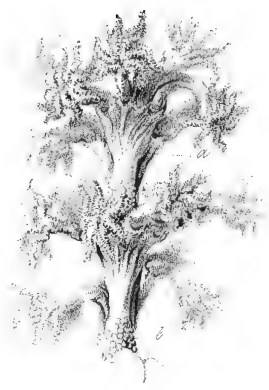
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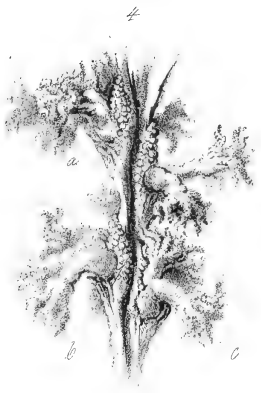
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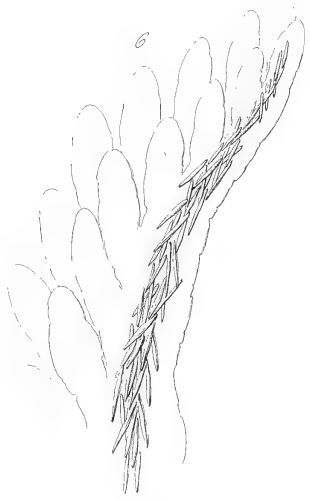
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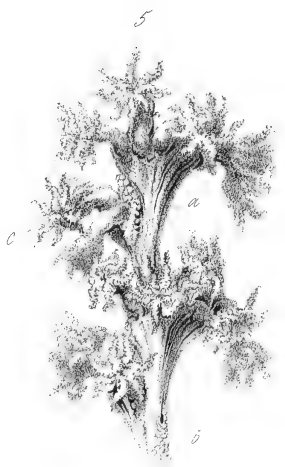
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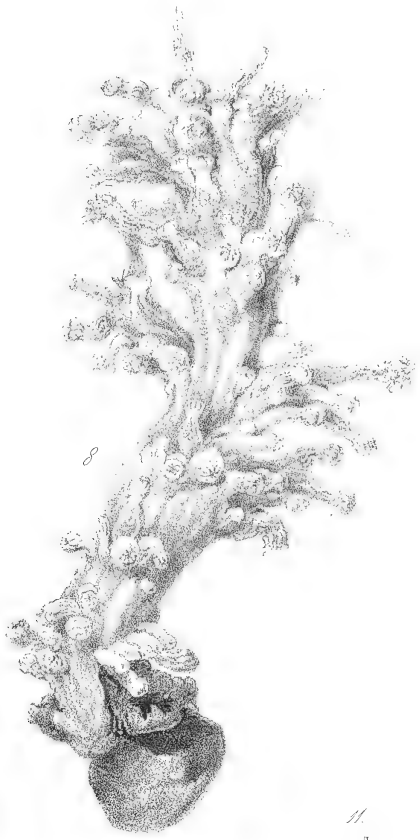
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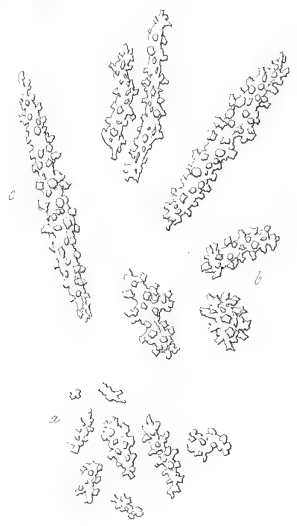
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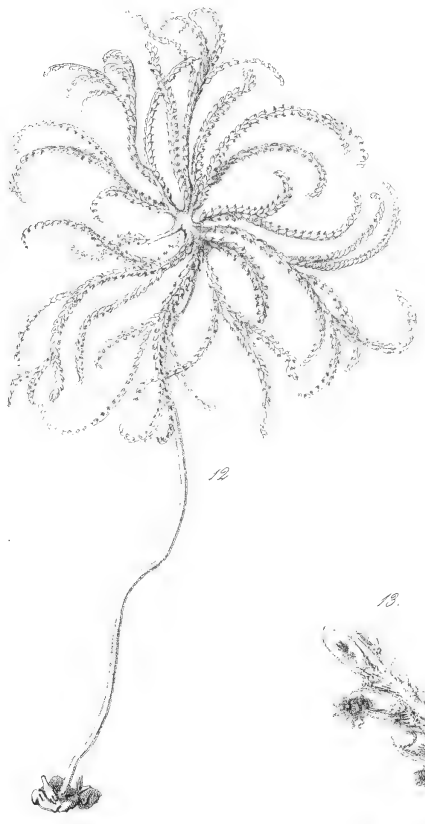
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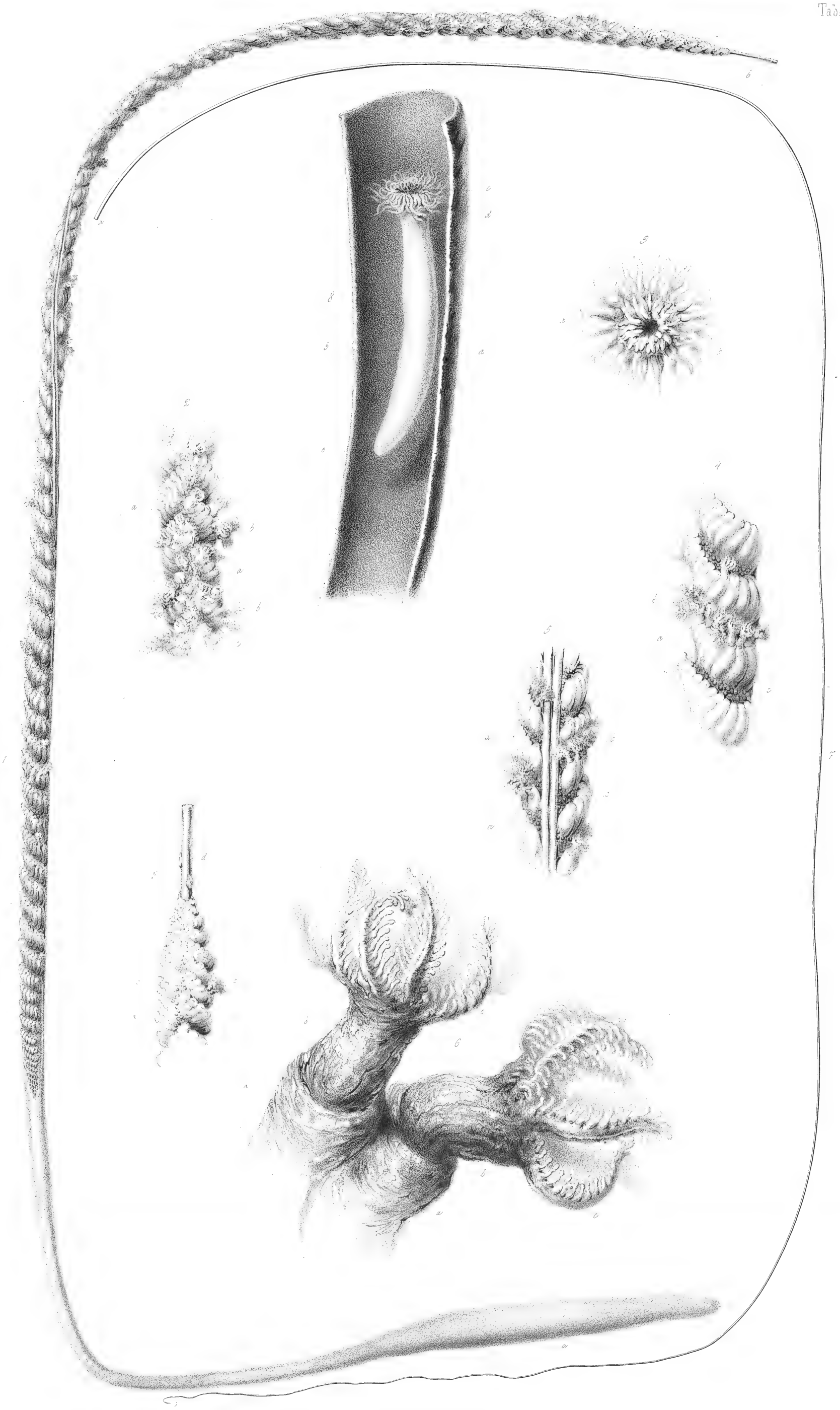

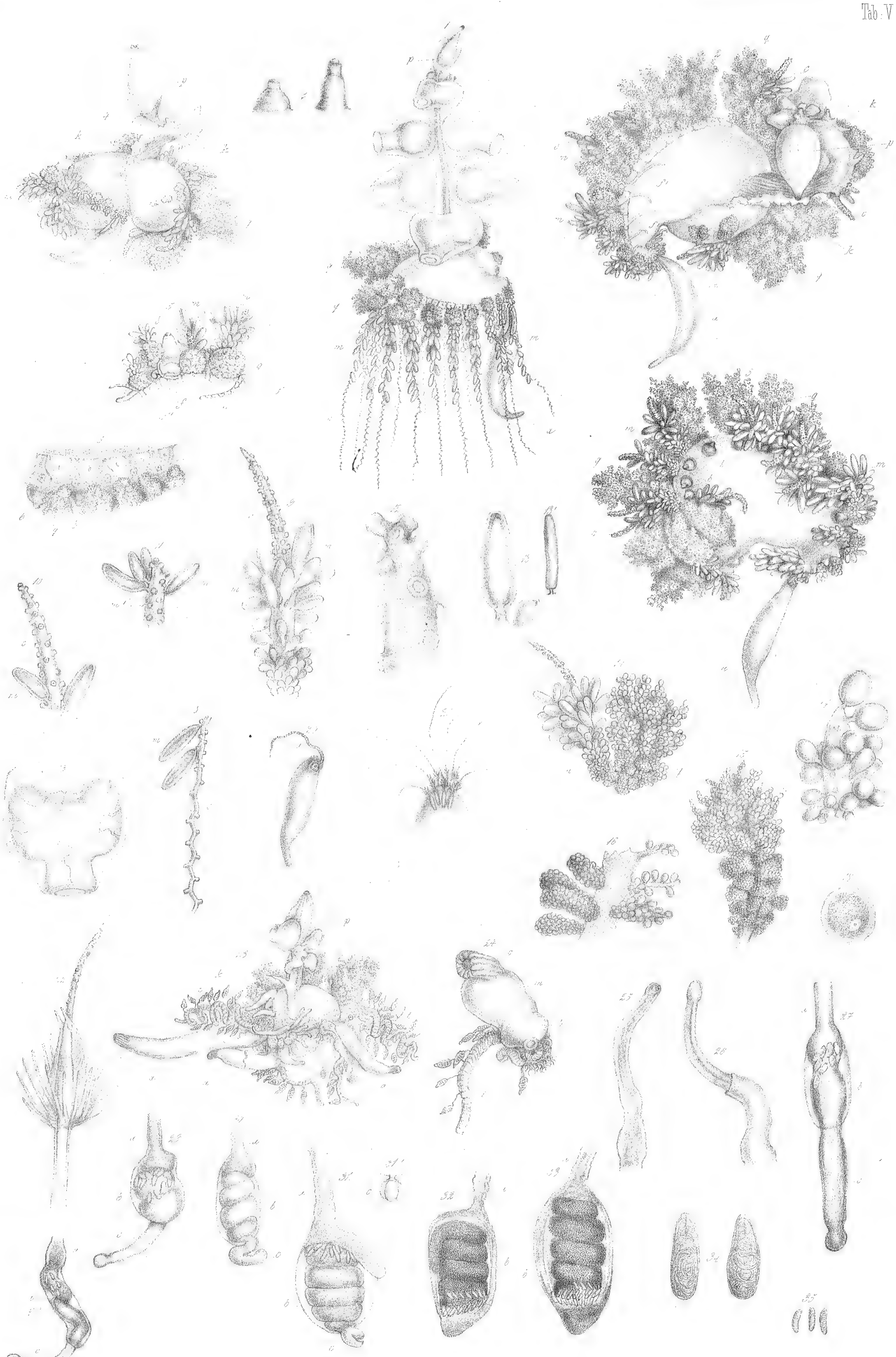

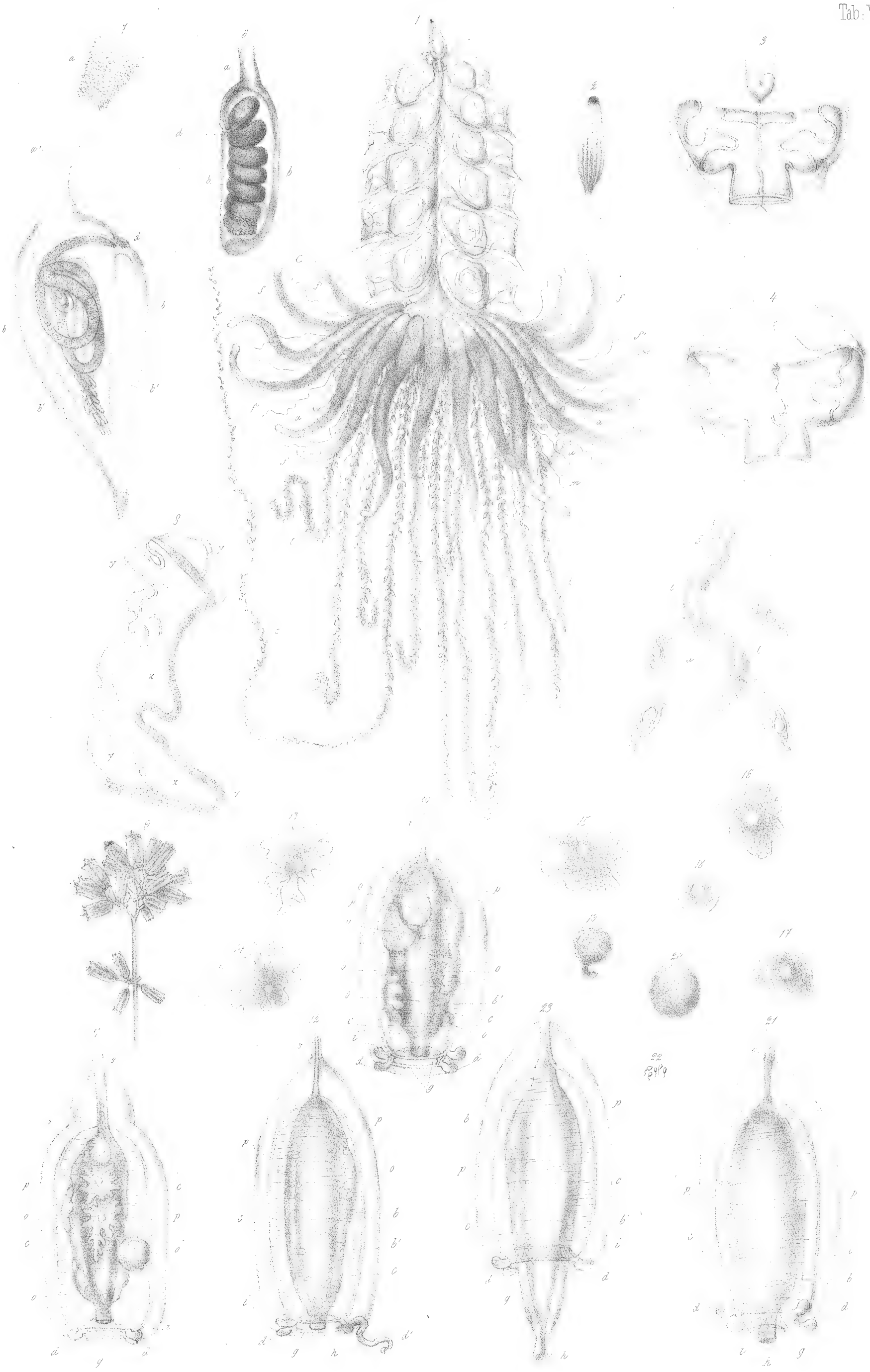

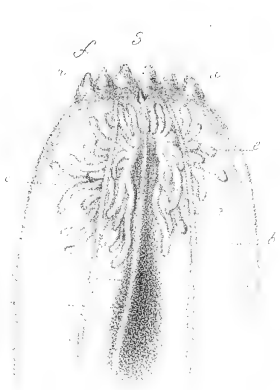

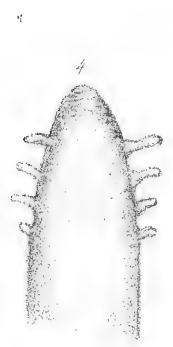

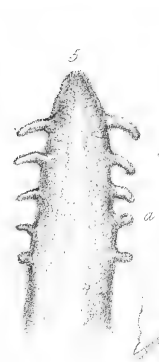

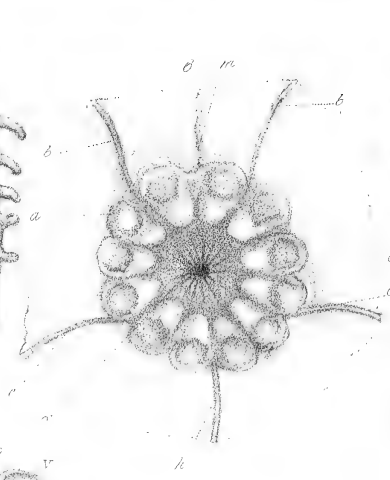

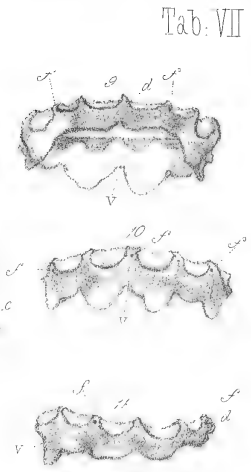

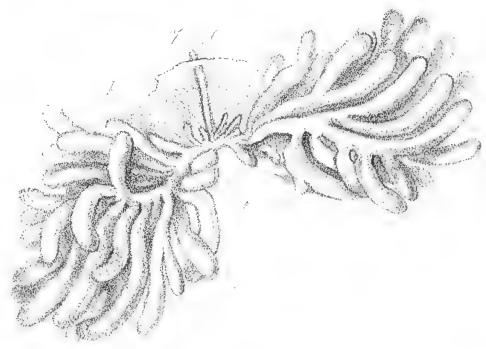

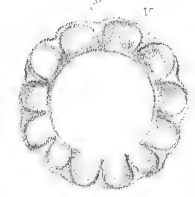

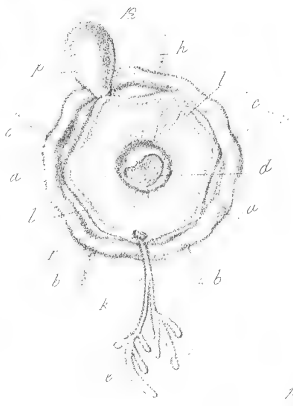

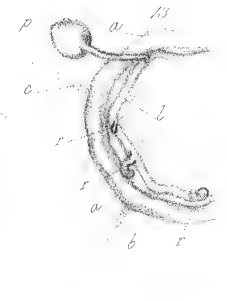

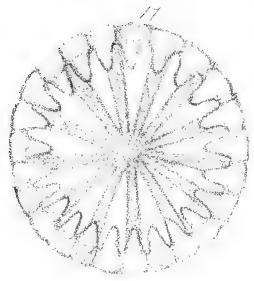

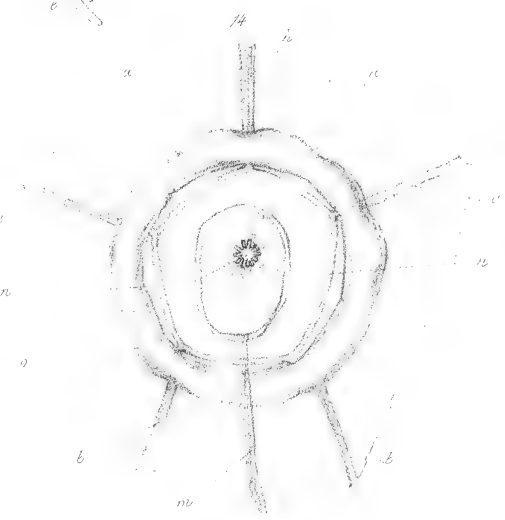

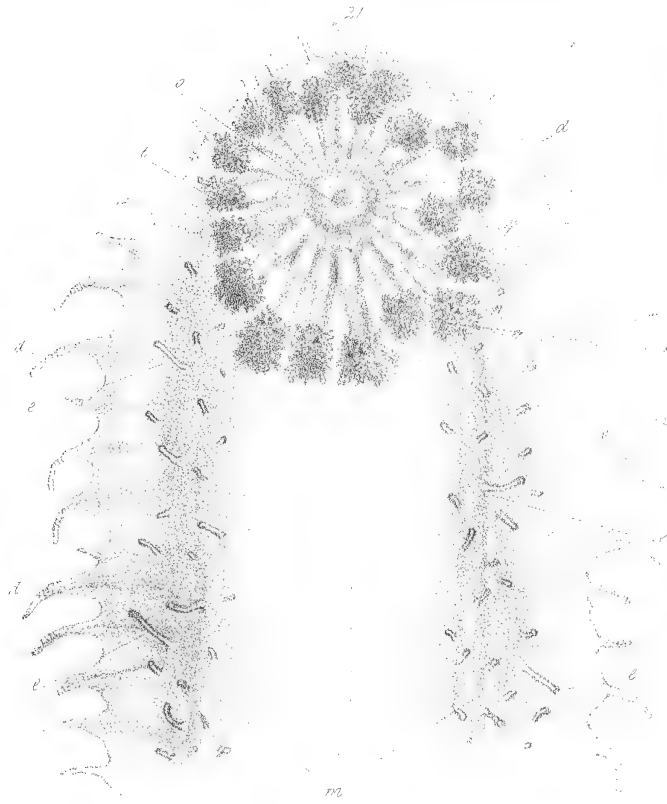

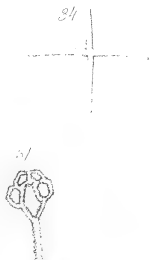

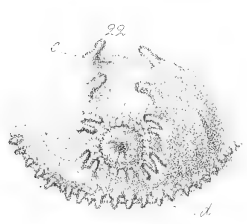

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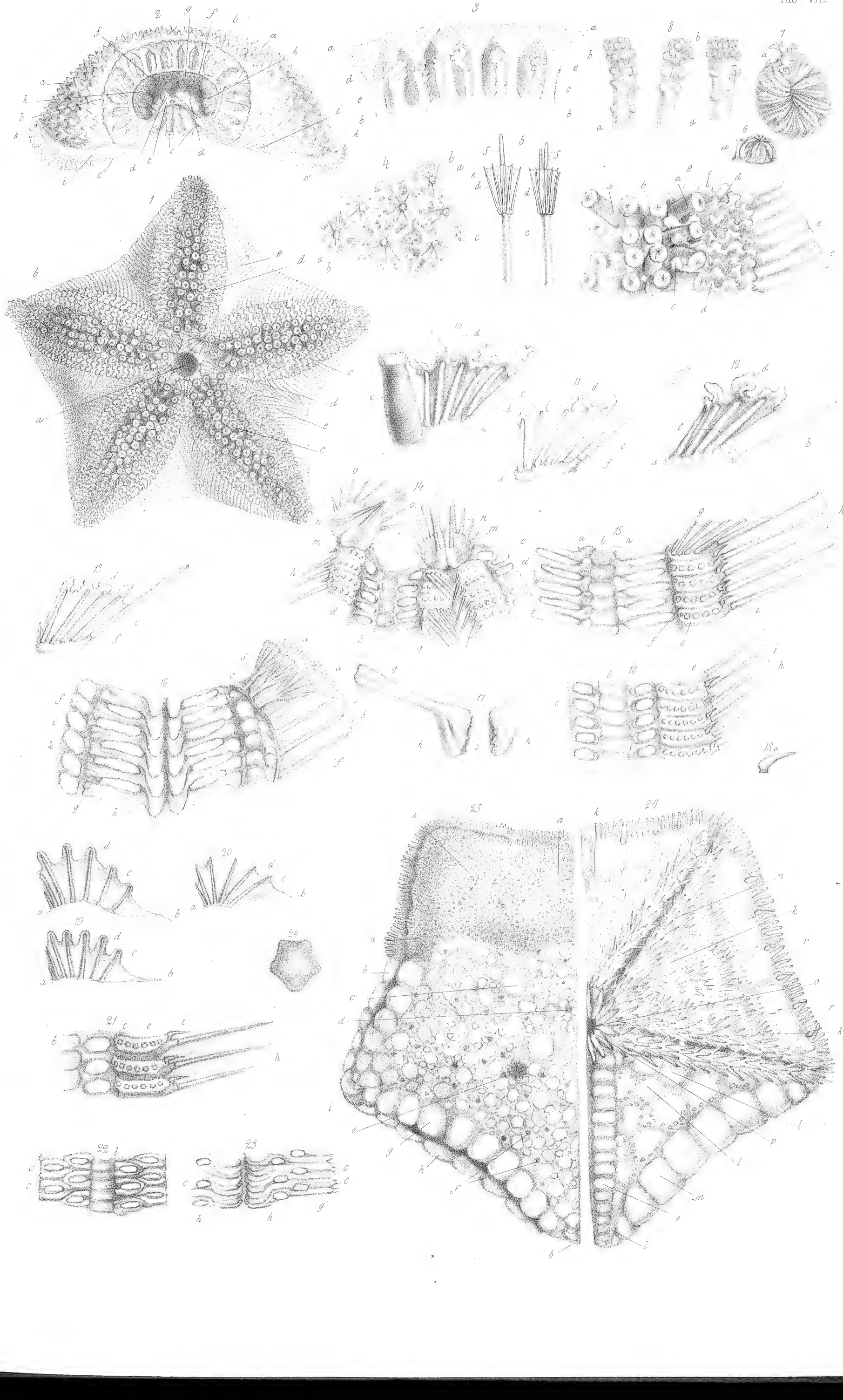

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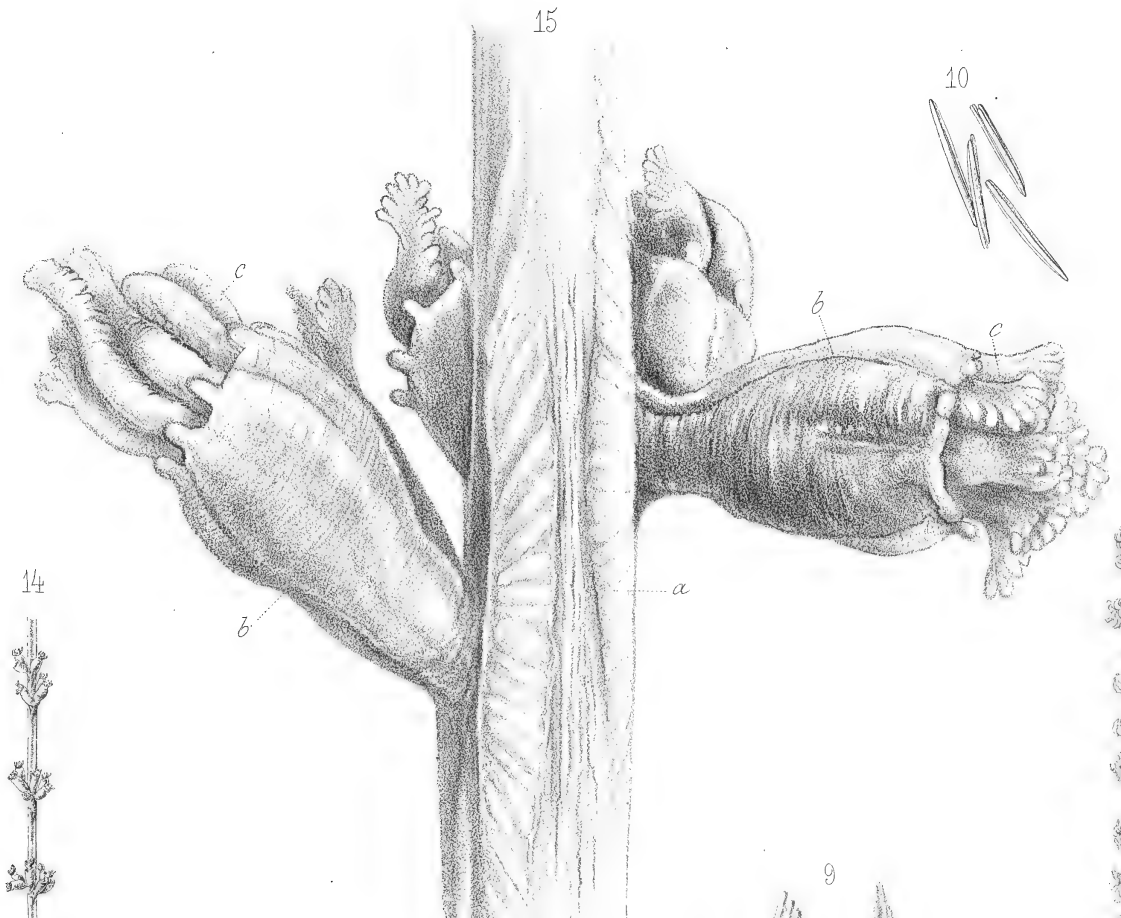

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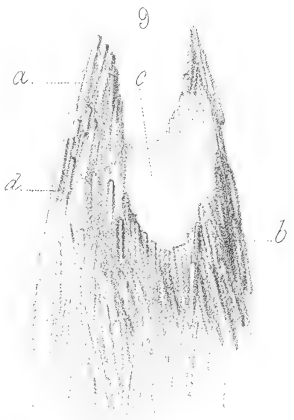

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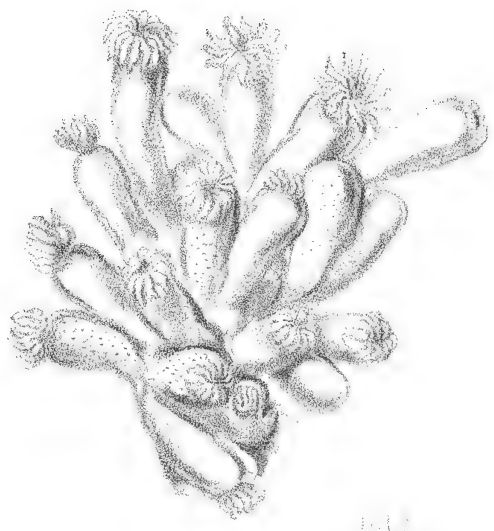

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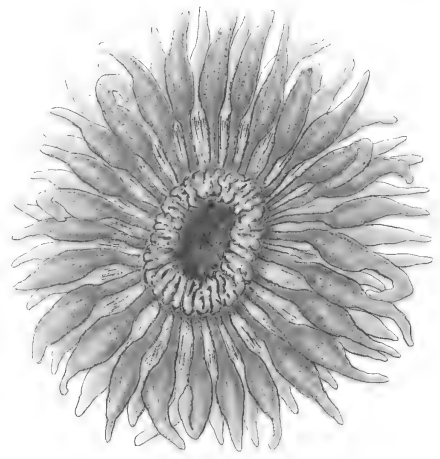

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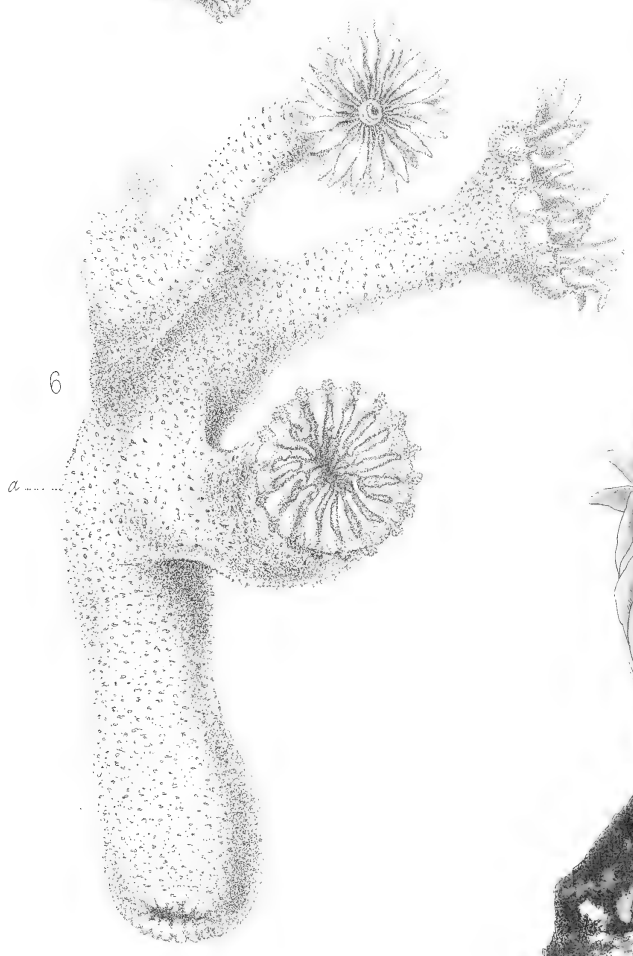

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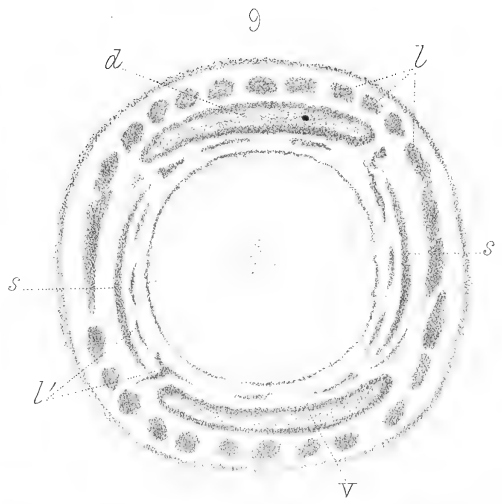

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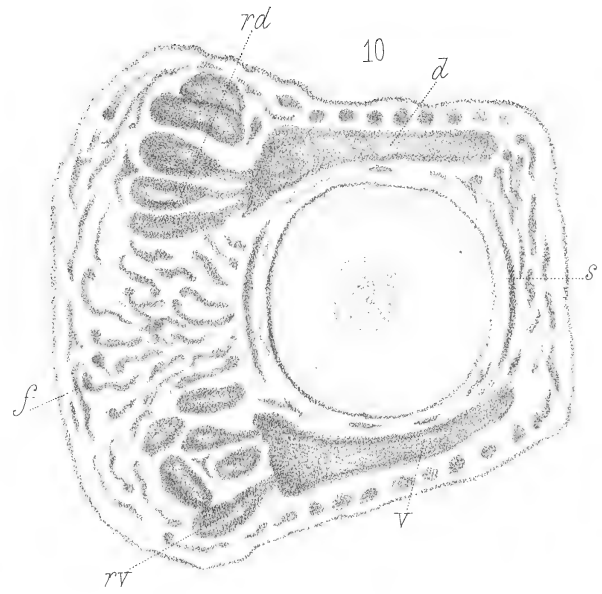

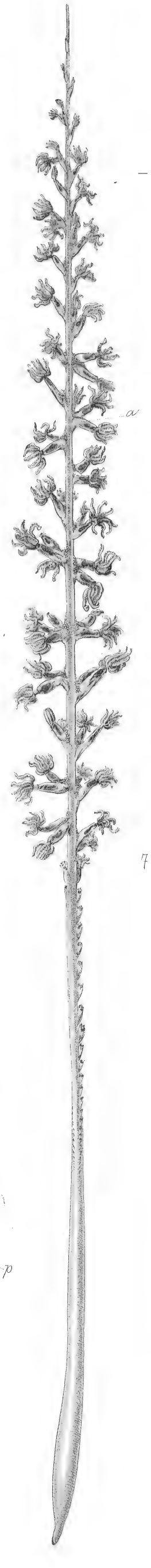

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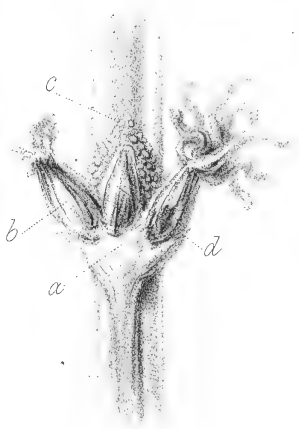

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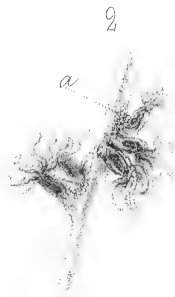

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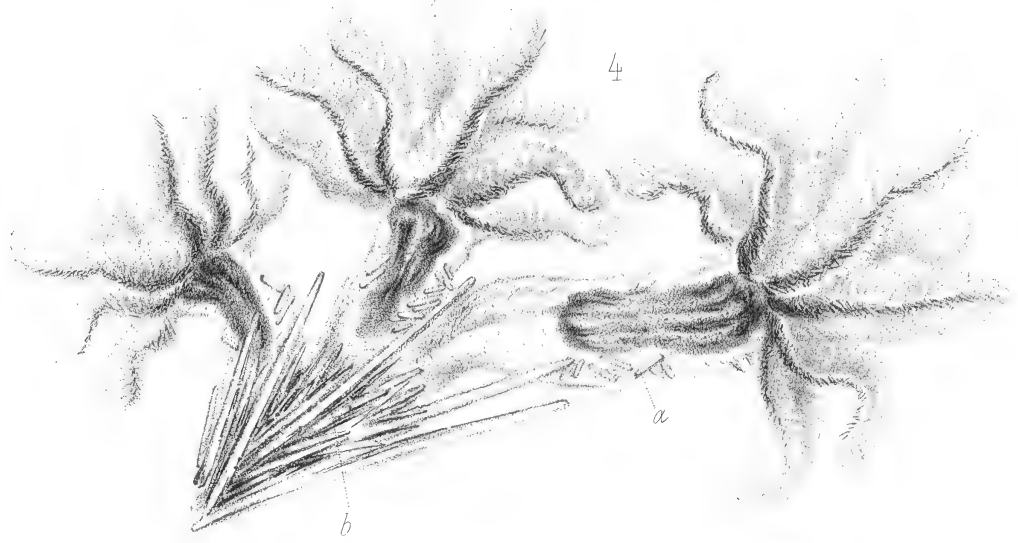

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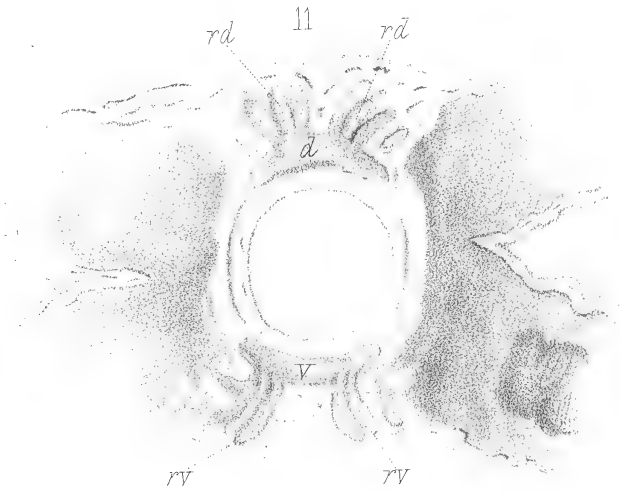

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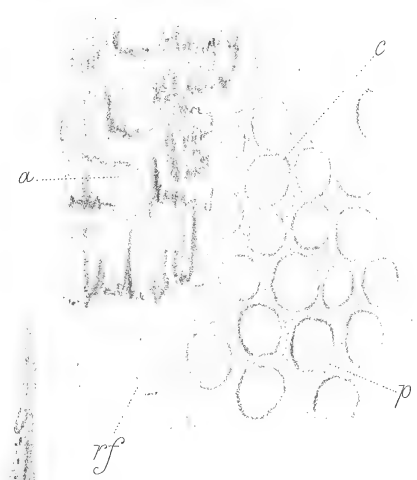

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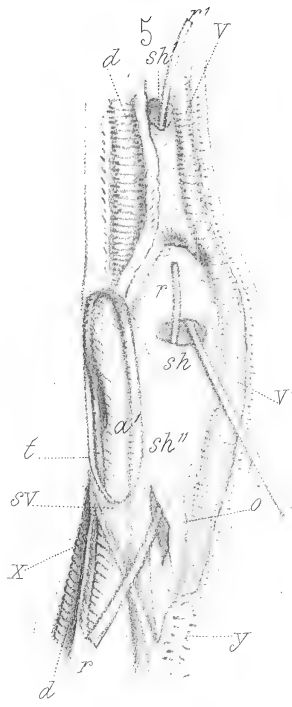

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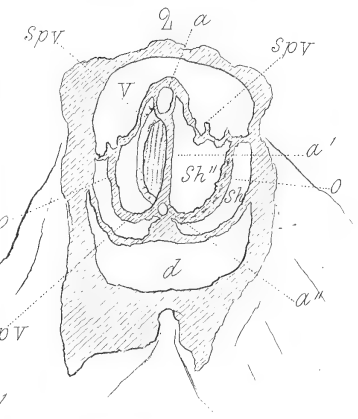

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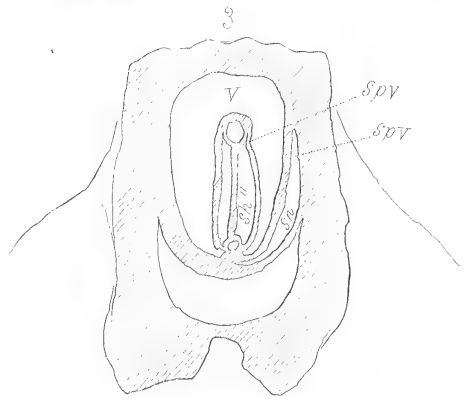

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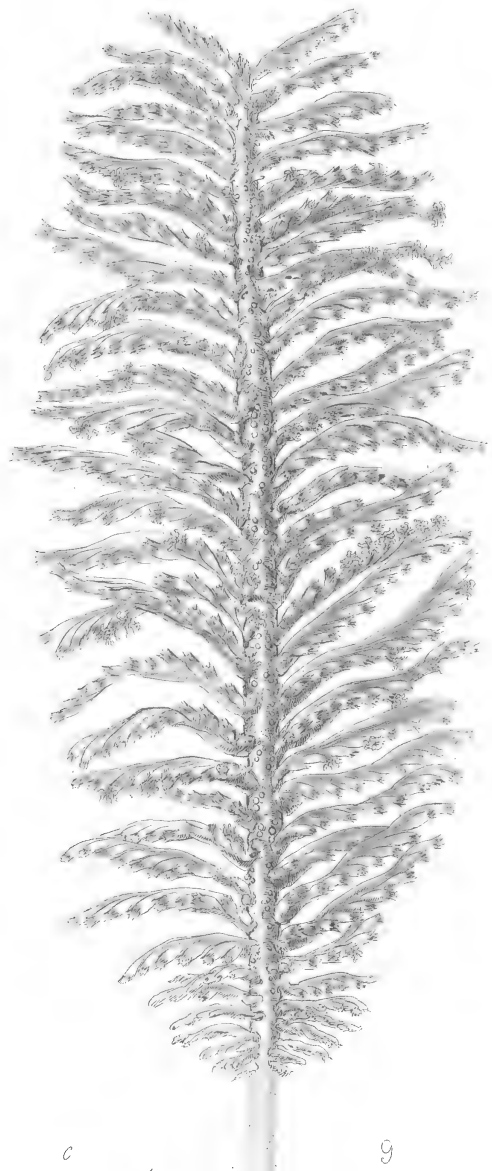

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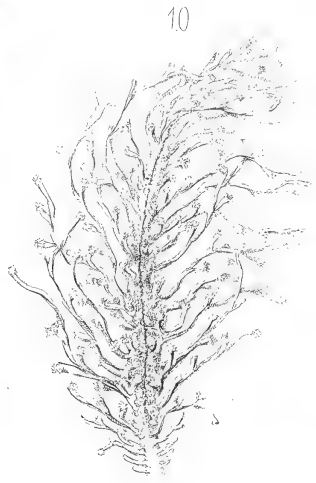

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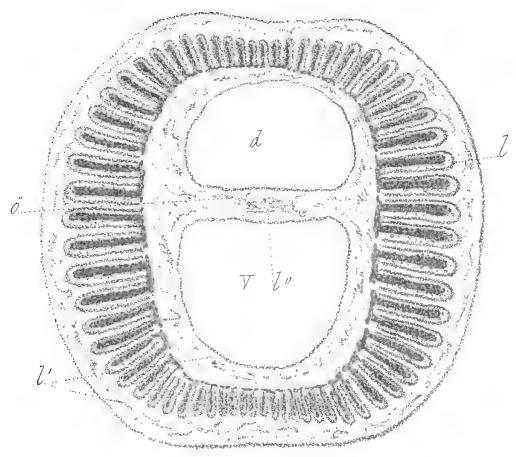

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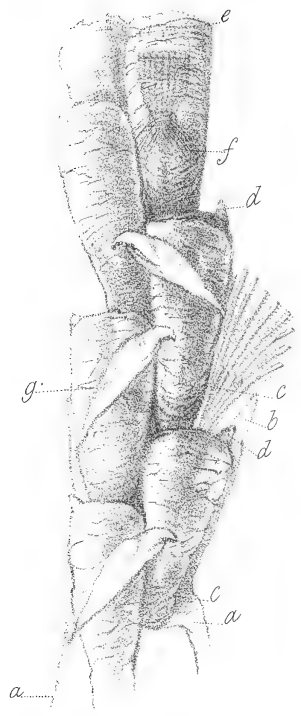

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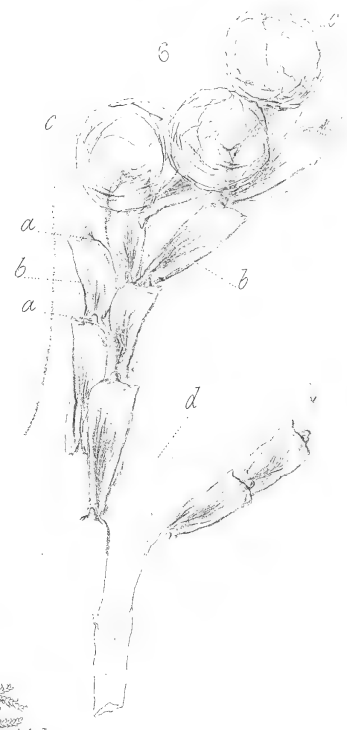

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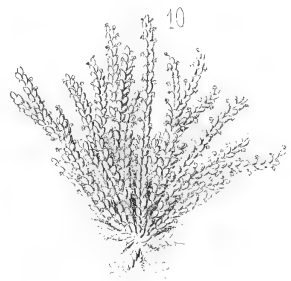

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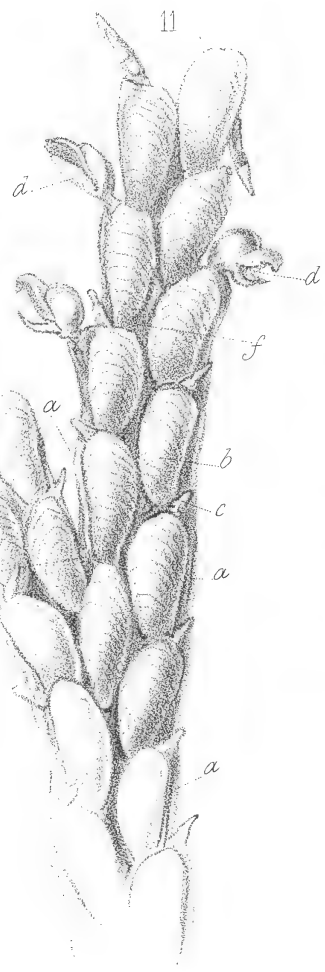

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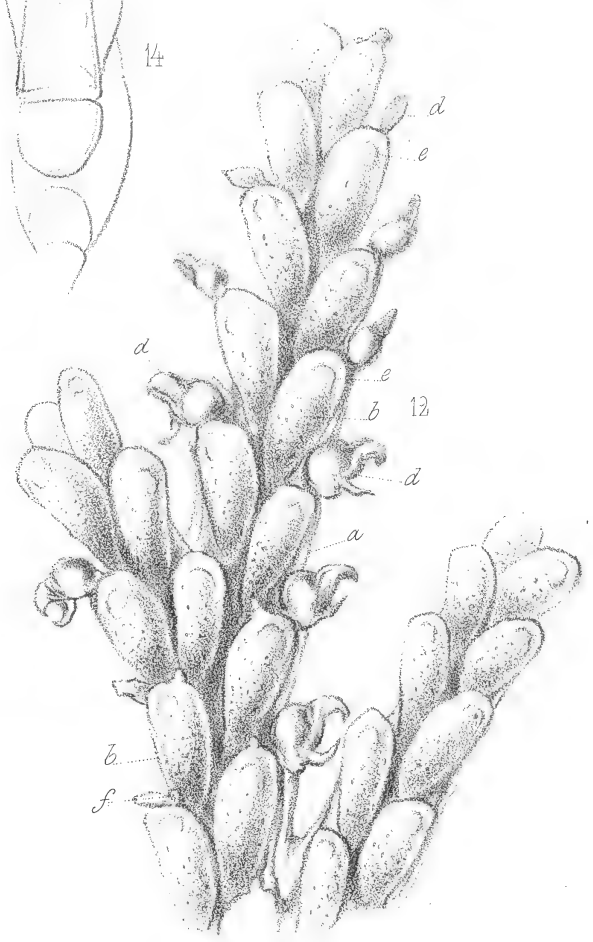

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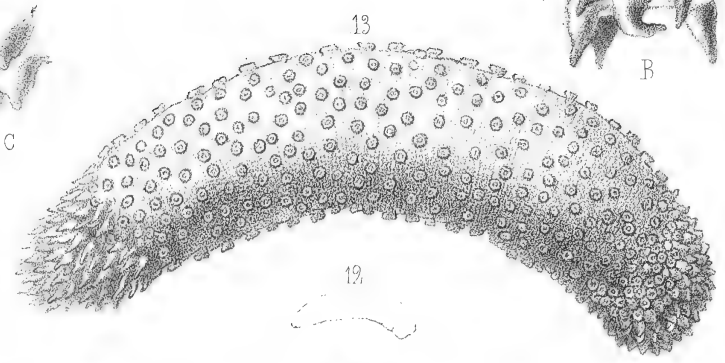

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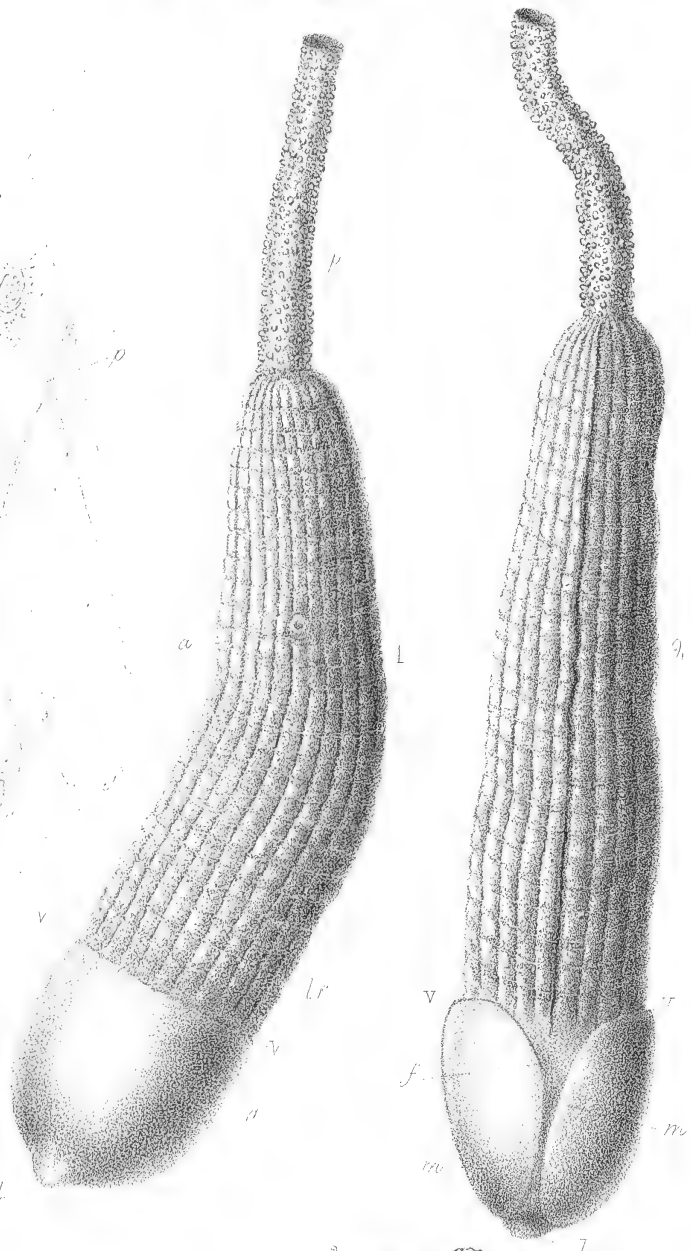

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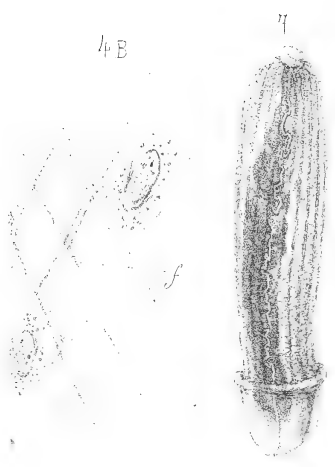

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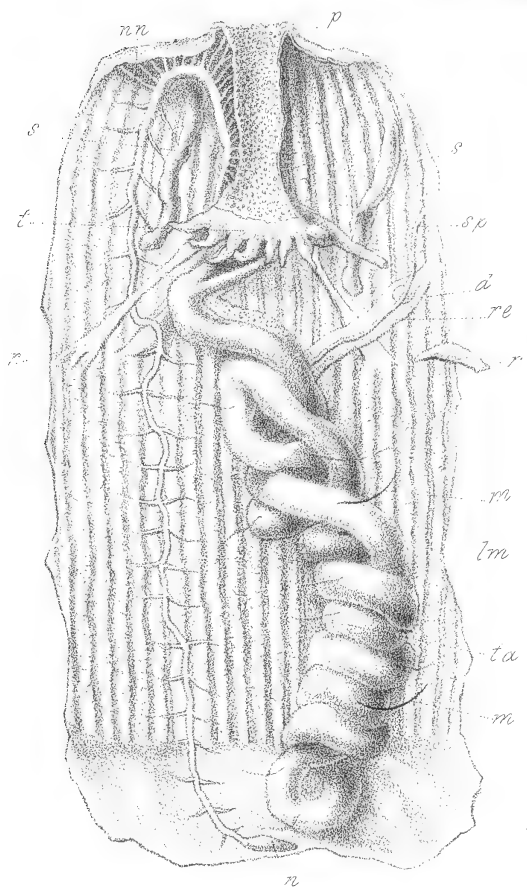

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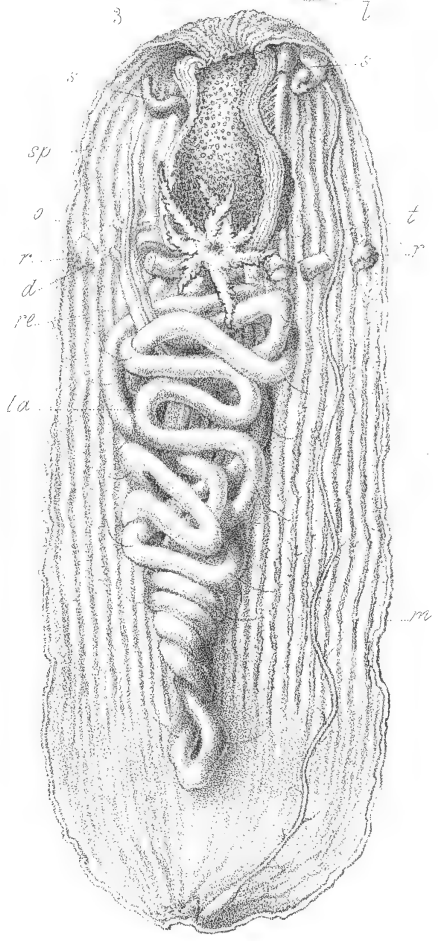

Fig. 1, 2, 3, 8, 13 M. Losting del.

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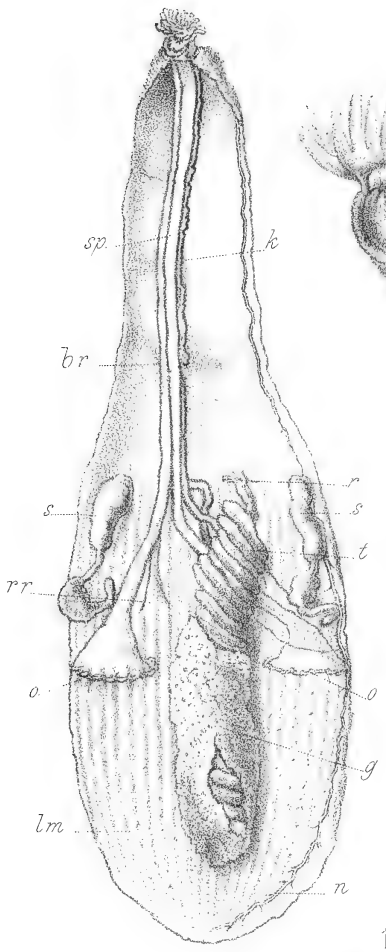

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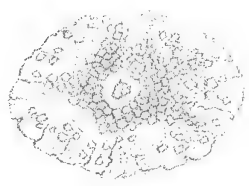

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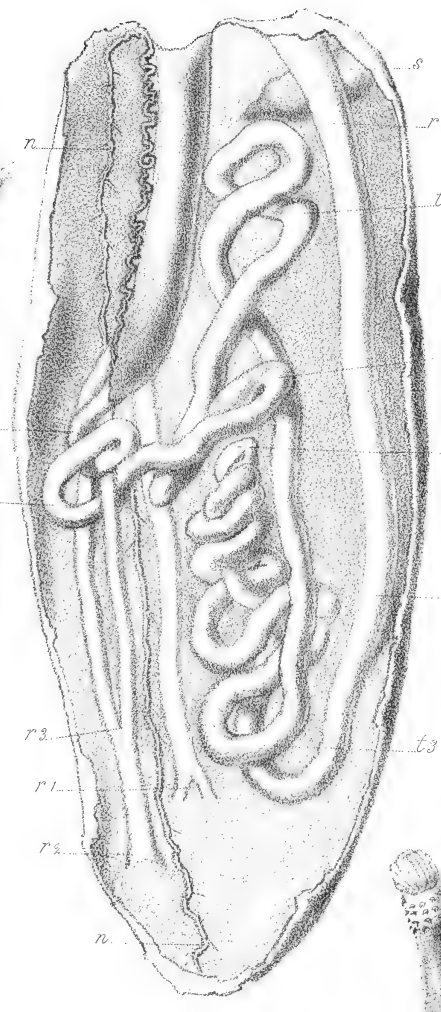

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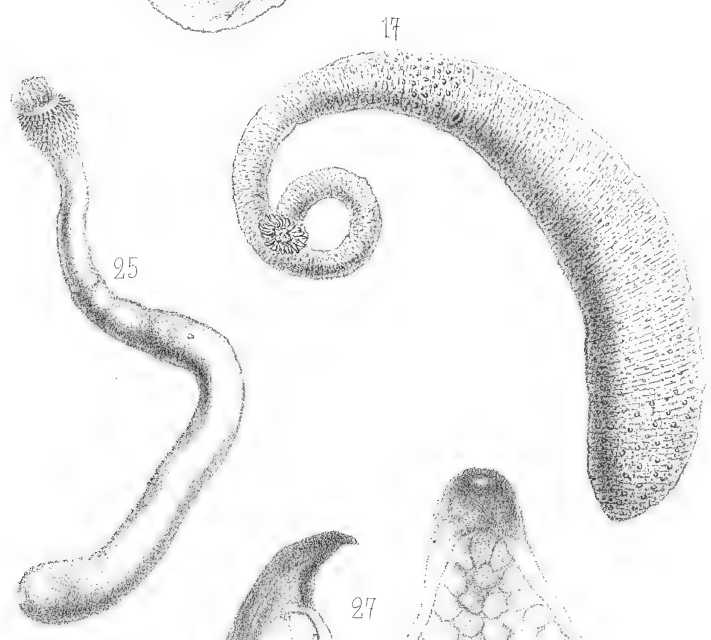

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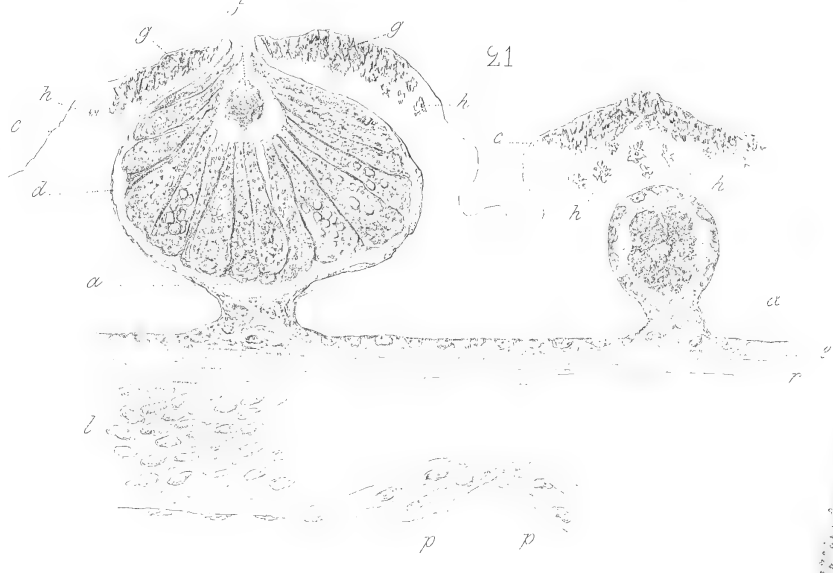

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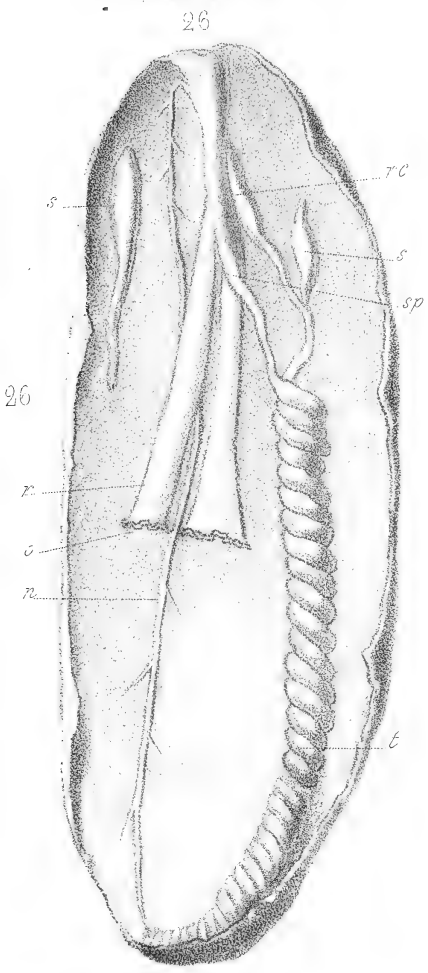

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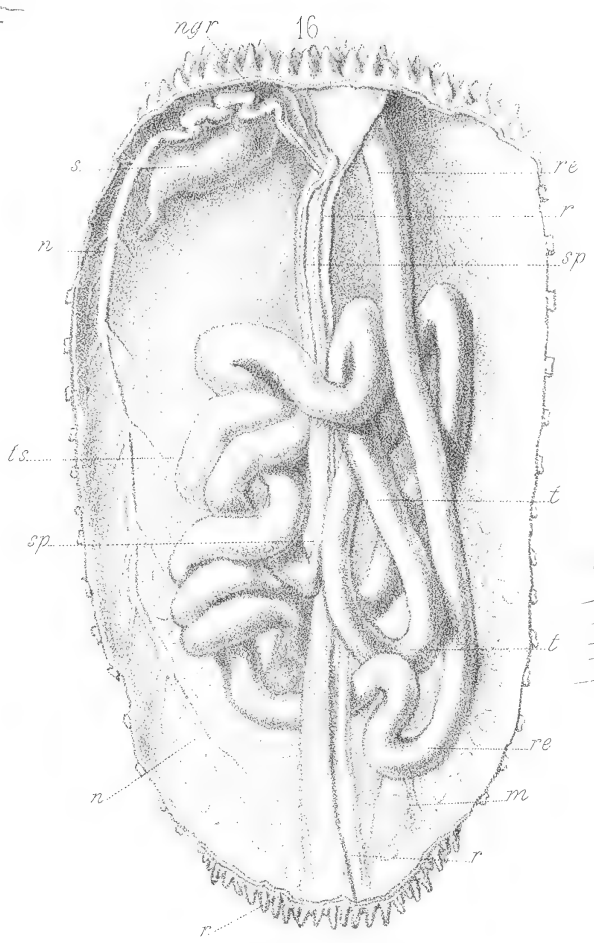

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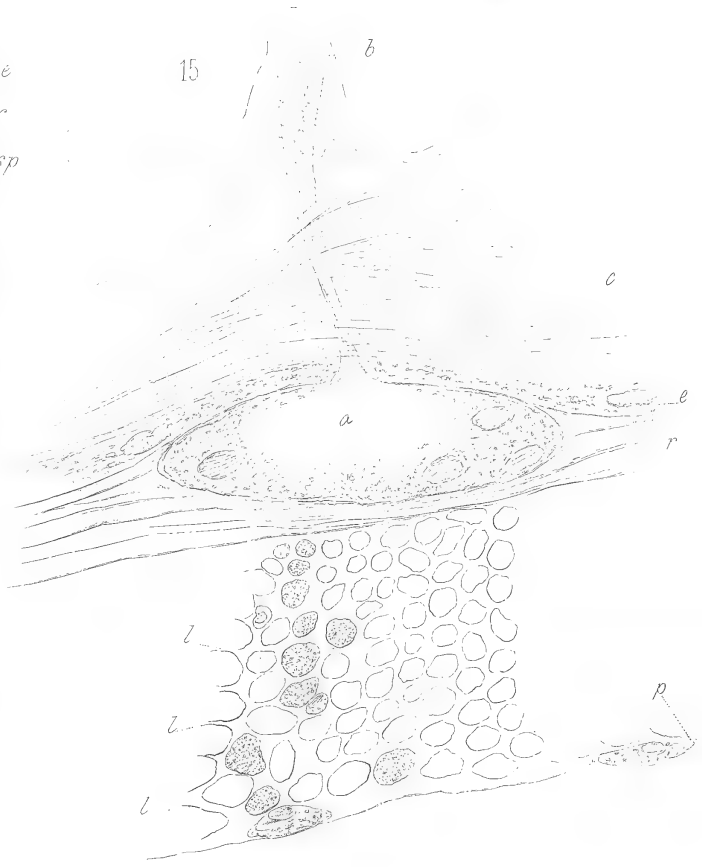

Fig. 17, 18, 19, 20 M. Lostínǧ del.

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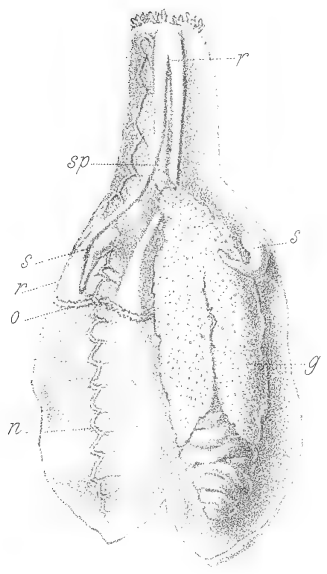

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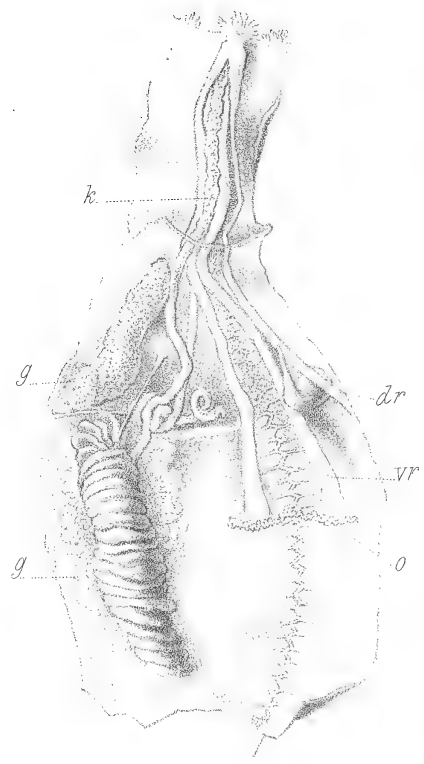

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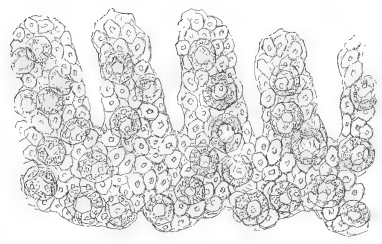

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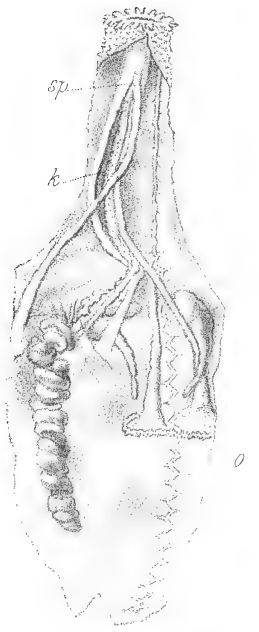

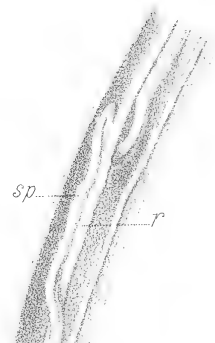

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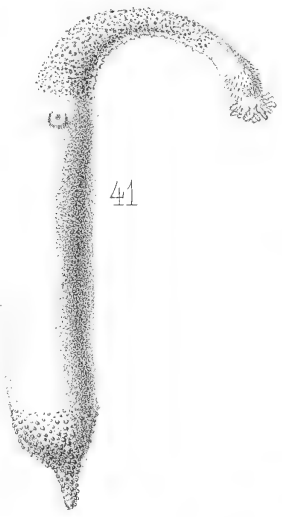

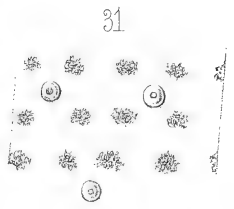

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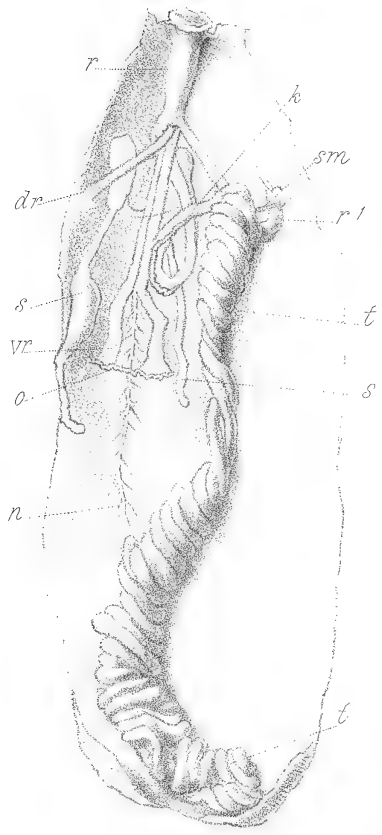

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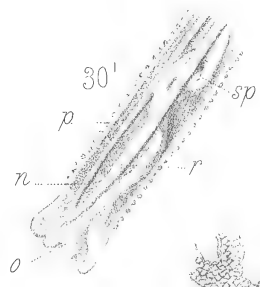

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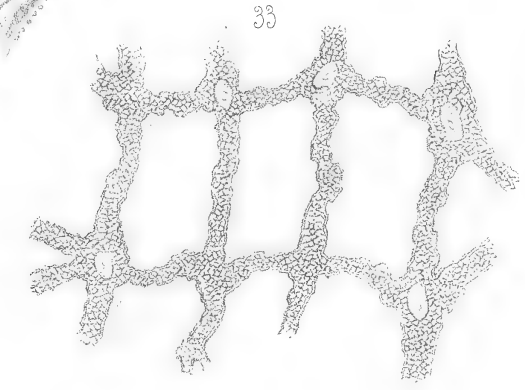

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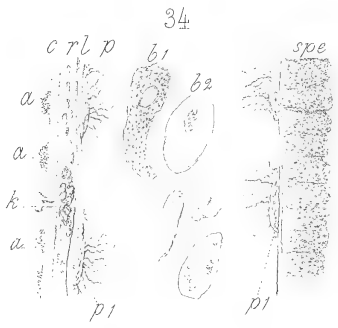

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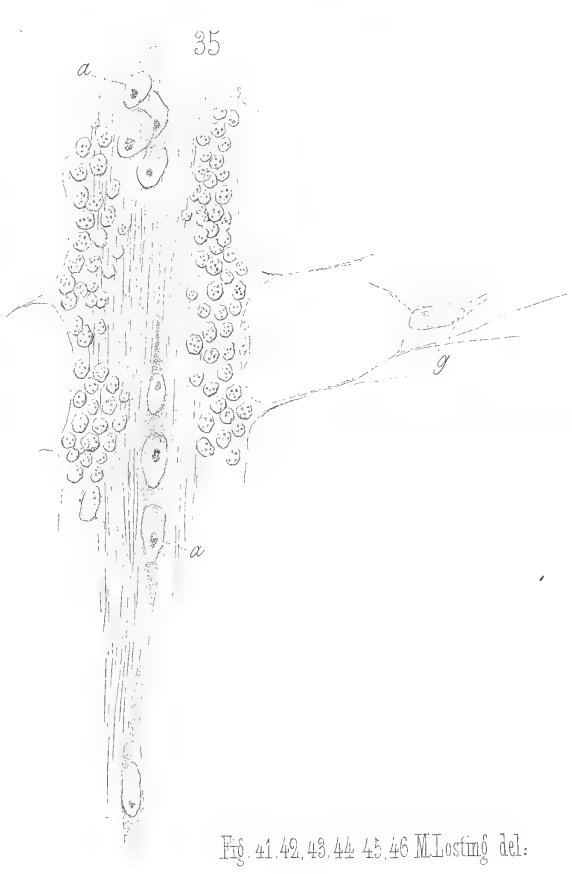

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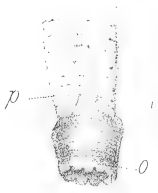

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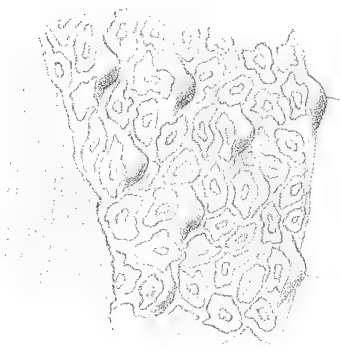

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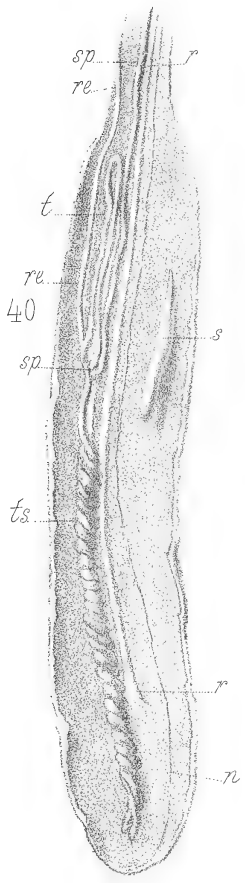

Fig. 41.42.43.44 45.46 M.Lostmg del:

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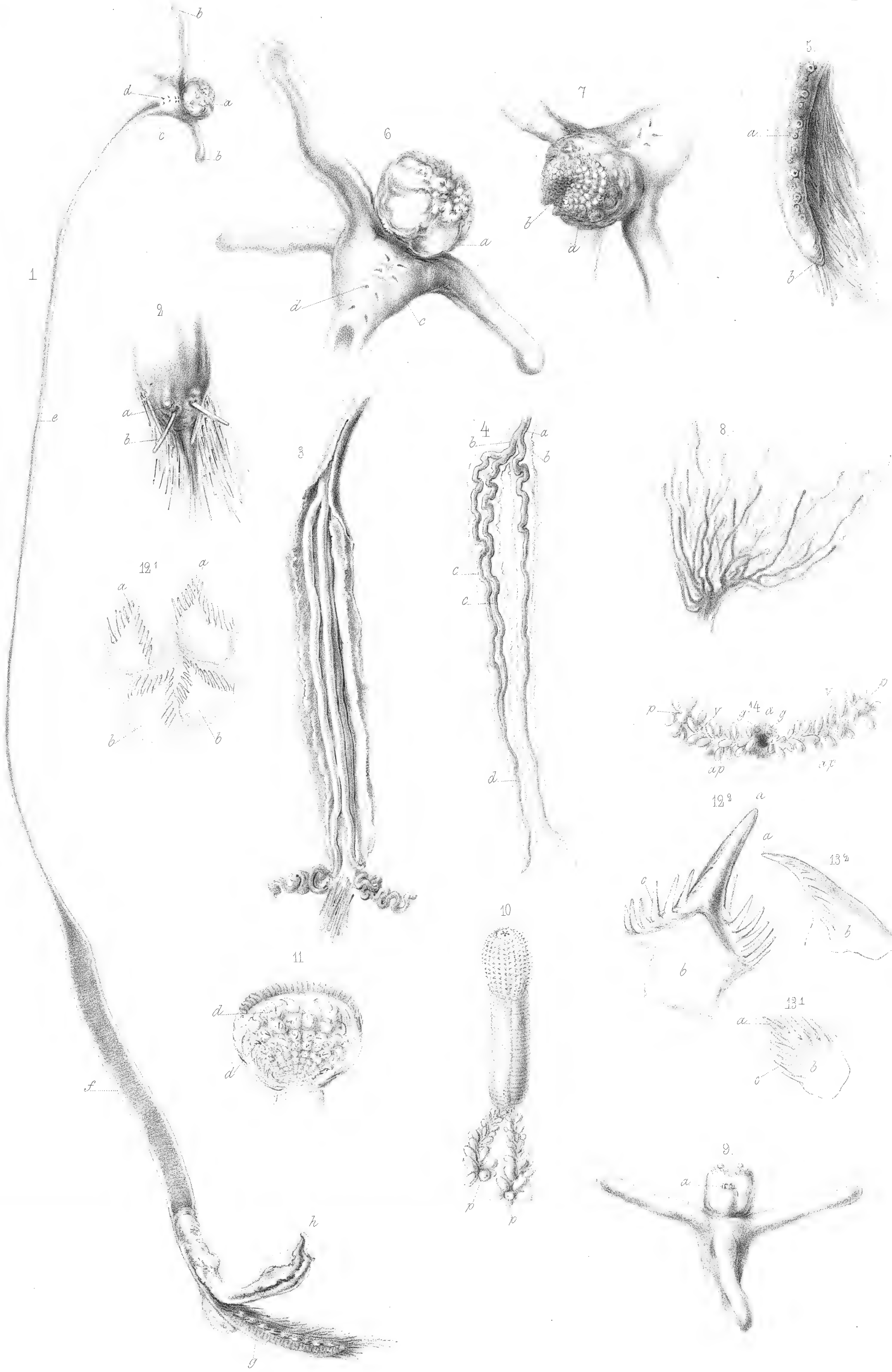

Bucher's lith. Inst., Bergen